

M 045 0002

**Reilly Wendover Bond Calculation**

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DIV OF OIL GAS & MINING

11/26/2003

## Reilly Wendover Reclamation Bonding Requirements

### **SUMMARY:**

It has been determined by the State Office Minerals Staff that it is necessary for a bond to be placed with the BLM by Reilly Industries. This bond is to insure reclamation of disturbed areas within their Federal mineral leases at their potash operation near Wendover Utah. The lease states "...to the extent deemed necessary by the lessor to fill any pits, ditches and other excavations..." The reclamation requirements are that ditches will be backfilled, baffle walls will be pushed into adjacent borrows and dikes be reclaimed. This only includes lands that are currently under lease. This does account for lands that are currently applied for under a fringe acreage lease. A cost estimate for reclamation has been performed by the Minerals Staff and resulted in the following:

**Equipment: D7H LGP Dozer**

**Production Rate: 326 cubic yards per hr**

**Time for Reclamation: 30 months**

**Recommended Federal Bond Amount : \$1,000,000 (Reclamation and Rental)**

**\$925,721 Reclamation and \$74,100 Advanced Royalties**

### **INTRODUCTION:**

The Reilly Potash operation is located at the western end of Tooele County, Utah, approximately 4 miles east of the community of Wendover Utah. This area is extremely flat with a nominal elevation of 4,212 feet above sea level. The production of market grade potash at this operation consists of four basic steps:

1. Brine collection
2. Concentration of brines through evaporation
3. Precipitation and collection of potash
4. Flotation concentration and drying of the potash ore.

In order to perform these basic steps many miles of ditch were excavated to transport the brine to primary ponds which include baffle walls designed to concentrate brines. This report will evaluate the costs of backfilling the ditches and excavating baffle walls located on federal and state mineral leases.

### **EARTHWORK REQUIRED:**

The total length of ditches and baffles were approximated from the map at Appendix 1 and verified with the map dated 1994 submitted from the company to BLM. The resulting lengths are as listed in Table 1.

**TABLE 1.**

<b>Total Length of Ditches and Baffles (feet)</b>				
Type	Collection	Dike	Baffles	Total
Federal	74,077	47,223	58,010	179,310
Pond V	36,960	0	0	36,960
State	4,800	13,700	4,500	23,000
Total	115,837	60,923	62,510	239,270
Encroachment	0	0	0	0
Grand Total	115,837	60,923	62,510	239,270

The length of each ditch was then multiplied by their average cross sectional area. These areas for the collection ditch and the baffles were calculated using the diagrams submitted by Reilly Industries as attachments to the Production Plan for Pond System V and field verified. The area for the primary pond was measured on 19 June 1995. The diagrams are in Appendix 2.

1. Collection Ditch = 240 sq. ft.
2. Seal Ditch (Dike) = 296 sq. ft.
3. Baffle walls = 53 sq. ft.

Once this calculation is carried out, the resulting figure is the cubic feet of soil that must be relocated. This figure was then converted into cubic yards using the following equation:

$$yd^3 = ft^3/27$$

where:

yd<sup>3</sup> = Cubic Yards of soil

ft<sup>3</sup> = Cubic feet of soil

The cubic yardage of soil to be moved is summarized in Table 2.

**TABLE 2.**

<b>Cubic Yardage of Soil to be Moved</b>				
Type	Collection	Dike	Baffles	Total
Federal	986,996	517,704	113,871	1,618,571
State	42,667	150,193	8,833	201,693
Total	1,072,329	667,897	122,704	1,862,930
Encroachment	0	0	0	0
Grand Total	1,072,329	667,897	122,704	1,862,930

## EQUIPMENT SELECTION:

Equipment selection is limited by the load bearing capacity of the soil surface. In a study performed by the Utah State Department of Highway in cooperation with the Bureau of Public Roads on the immediate surroundings, unconfined compression tests determined the load bearing capacity of the soil to be 10 psi. The reference page from the report can be viewed in Appendix 3. Reilly Industries equipment of choice to perform the excavation work is a dozer. Referencing to Caterpillar's Performance Handbook (25th Anniversary Edition, 1994), it was determined that the D7H-LGP is the highest production dozer that could be used. This dozer has an applied stress of less than 7 psi on the soil, which is a reasonable 3 psi less than the suggested limit. The D9N, D10N and the D11N dozers all apply loads of 14.3 psi or higher which eliminates them from consideration. The D8 dozer applies a load on completely level ground of less than 10 psi by this would be increased above the 10 psi dozing on a slight grade. The loads applied to the soil by the dozers were calculated by using the specifications section of the Performance Handbook. In this section the overall weight of the dozer and the ground contact area of the dozer shoe were given and can be viewed in Appendix 4. Using these two parameters, the load per square inch applied by the dozer on the soil was calculated by using the relationship:

$$\sigma'_d = W_d/A_d$$

where:

$\sigma_d$  = Stress applied by the dozer on the soil (psi)

$W_d$  = Weight of the dozer (lb)

$A_d$  = Dozer shoe ground contact area (sq. in.)

A D-8 Dozer could be utilized to do the work inside of the Primary Pond V, but that would take extra mobilization costs. In order to avoid these costs, the dozer that is picked in the follow analysis was chosen to do all the work.

### Production Rate of the Equipment:

The production rate of the D7H-LGP was calculated using the Caterpillar Performance Handbook, Bulldozer Section, pages 1-59 and 1-61. Page 1-58 is a graph of the production vs. dozing distance and page 1-61 is a step by step explanation on how to use the graph to estimate the actual production of the dozer, taking into account site specific factors. Both of these pages can be inspected in Appendix 5.

The following is a direct accounting for each correction factor used in the production rate calculation.

The average push is assumed to be 56 feet. This is an average of 60 foot push (986,996 yds) [based on 50 foot push from the inby edge of the berm of the ditch and assuming the berm being 10 feet in width] on the collection ditches and a 50 foot push on the remainder (517,704+113,871+42,667 =674,242 yds) remainder of the ditches.

The uncorrected Hourly Production ( $P_u$ ) (graph in Appendix 5) = 940 LCY/Hr

### Correction Factors:

1. Operator (**O**): Assuming that the operator will be average, the suggested correction factor is 0.75

2. Material (**M**): The silty sandy material present is generally dry and can flow when wet.



The suggested correction factor is 0.8.

3. Job Efficiency ( $E_j$ ): The operator will be in charge of general maintenance of the dozer (lube, oil, filter). Taking this factor into account, along with startup time, breaks and miscellaneous delays, the efficiency of 50 min/hr is estimated. The suggested correction factor is 0.83

4. Material density ( $D_m$ ): The material to be moved can be characterized as a silty sandy material. Generally, moist sand has a density of 2850 lbs/yd<sup>3</sup> which is in Appendix 6. The suggested correction factor is 2300 lb/LCY/2980 lb/LCY for a factor of 0.81.

5. Bank Load Factor ( $B_{lf}$ ): To change Loose Cubic Yards to Bank Cubic Yards the equations is  $BCY = LCY * \text{Load Factor}$ . The Load Factor is figured using sand and dry clay. From the weight of materials table Page 26-4 (Cat Performance Handbook 27<sup>th</sup> edition – 1996) Sand is .89 and dry clay is .82. The average would be .86

Using these correction factors, the actual production is calculated as follows:

$$\text{Production Rate} = (O) * (D_m) * (E_j) * (P_w) * (M) * (B_{lf}) = (.75) * (.81) * (.83) * (940) * (.8) * (.86)$$

The resulting site specific **Production Rate is 326 Bank yd<sup>3</sup>/Hr.**

## RECLAMATION TIME:

Due to extremely wet conditions during late fall, early spring and winter, six months will be considered the number of working months per year. This effects the number of mobilizations that will take place and will directly affect the cost as will be shown later. The operator will not work Saturday or Sunday. The shifts will be 8 hours shifts, 5 days per week. Taking into account these constraints, there will be 173 working hours per month. Knowing the production rate per working hour, the monthly production rate of the dozer can be calculated. This was accomplished by using the relationship:

$$P_m = H_w * P_h$$

where:

$P_m$  = Monthly Production

$H_w$  = Working Hours per Month

$P_h$  = Hourly Production

This calculation results in a monthly production rate of  $P_m = 56,414 \text{ yd}^3/\text{month}$ .

Next, the total number of working months to complete the job can be calculated using the relationship:

$$M_t = Y_t / P_m$$

where:

$M_t$  = Total Number of Months to Complete the Job

$Y_t$  = Total cubic Yardage to be Moved

$P_m$  = Monthly Production Rate

The total number of months it will take to complete the job will approximate  $M_t = 29.4$  months on Federal leases is  **$M_t = 30$  months** to complete the work required for reclamation.

## RECLAMATION COSTS:

### Operating Costs

The operating costs for the project was calculated using section 17 of the Caterpillar Performance Handbook and local diesel fuel costs. Section 17 has graphs and tables related to fuel consumption, repair costs, and lube, oil, filter consumption/changes. These graphs and tables along with the calculation sheet

used can be viewed in Appendix 7. The resulting costs are as follows:

$$O_c = ((F_u * F_c) + L_c) * (173 * E_j)$$

where:

$F_u$  = Fuel Usage is 7 gal/hr (Appendix 7)

$F_c$  = Fuel Cost at \$1.50/ gallon

$L_c$  = Lube, Oils, Filters, Grease Cost: \$0.68 per hour (Appendix 7)

$E_j$  = Operator Efficiency that was calculated in the Production Rate calculation above. In other words this is the only amount of time that the equipment will be operating.

173 = Number of work hours in a work month

This results in an operating cost for the dozer of  $O_c = \$1,450$  per month.

#### **Equipment Rental Rates, Mobilization and Insurance:**

The local Caterpillar distributor, Wheeler Machinery, was consulted for rental rates. They are located at 4901 West 2100 South, West Valley City. Their current rental rate as per 6 Feb 1996 is \$8917. This rate includes discounts for long term rental. Anything over 176 hours is an additional \$44.32 per hour. Currently this project is estimated at 173 working hours per month so the regular rate with the discount will be employed for cost purposes. Insurance is \$8.06 per month. Wheeler Machinery charges a \$640 mobilization fee for projects located within a 2 hour drive of their office. This mobilization fee will apply ever 6 months.

This rate is very close to the rate that is calculated in the 1996 Machinery Information Division of K-III Directory Corp. Rental Rate Blue Book Volume 1 (Appendix 8) of \$9208 (without mobilization). The \$9208 was calculated by using the D7H LGP Series II ROPS @ \$10,645/ month and then multiplying it by the factor for Utah which is 0.865.

The equipment cost for this project is derived as follows:

$$E_r = (D_r) + ((M_r * 2)/6) + I_r$$

where:

$D_r$  = D7 Dozer Rate: \$8917/month

1996 Basis inflation  $119.2/105.7 = 1.127$  or 13%,  $\$8917 * 1.13 = \$10,076$  – 2003 Basis. Wheeler Machinery quoted 10,800 per month in Nov 2003. Rates could be less for long period of rental.

$M_r$  = Mobilization Rate per event: \$640

$I_r$  = Insurance Rate: \$8.06/month

2 = Number of times per year that mobilization will occur

6 = Number of actual work months

This results in a monthly equipment rental rate of  $E_r = \$10,297$  per month.

#### **Operator's wages (including fringes)**

If the government was to contract out this effort, Davis-Bacon Act wages would have to be used. These wages for a dozer operator in Tooele County are found in Appendix 9. These include fringe benefits.. The cost was formalized by the following correlation:

$$O_w = O_r * 173$$

where:

$O_r$  = Operator wage rate of \$25.75 (Appendix 8)

1992 Basis. Inflated to 2003 is  $119.2/98.7 = 1.207$  or 21%  $1.21 * 25.75 = \$31.16$

173 = Number of work hours per month

This results in a monthly Operator rate of  $O_w = \$5390$  per month.

### Travel Cost

Because of the remoteness of the project location, per diem and travel compensation will be necessary. This rate is set at \$86 per day and \$0.36 per mile. The estimate for the operator will include per diem five days a week and \$86 (\$0.36/mile \* 240 miles) for traveling on the weekends. There will also be an allowance for travel of a supervisor to inspect the job progress once every two weeks. The traveling distance covered will be 240 miles round trip. This is sufficient for travel to Salt Lake City, Utah or Elko, Nevada. All federal documents related to the per diem can be viewed in Appendix 10.

The overall amount for per diem and travel will be calculated using the following relations:

1 month = 4 weekends

1 month = 21 working days

This was calculated as follows:

$$T_c = O_t + S_t + O_p + S_p$$

$$O_t = (M_r * O_m) * 4.3$$

$$S_t = (M_r * S_m) * 2$$

$$O_p = D_r * 21.67$$

$$S_p = D_r * 2$$

where:

$O_t$  = Operator Travel Costs

$S_t$  = Supervisor Travel Costs

$O_p$  = Operator Perdiem Costs

$S_p$  = Supervisor Perdiem Costs

$M_r$  = Mileage Rate of \$0.36 per mile

$O_m$  = Operator weekly mileage of 240

$S_m$  = Supervisor weekly mileage of 120

$D_r$  = Perdiem Rate of \$86 per day

21.67 = Number of working days per month

2 = Number of supervisor days per month

The monthly travel costs equated to  $T_c = \$3154$  per month.

Basis \$2003

### SUMMARY OF COSTS:

The following is a summary of all the costs included in the bond calculation:

#### Contractor Overhead and Profit

Means Facilities Construction Cost Data recommends a 15% increase to the total cost for the contractors overhead and profit. This is averaged from the 10% for OH & P from costs used in this book to the 20% OH & P for projects under \$2,000,000. The reference page of cost data can be viewed in Appendix 11.

### Contingencies

Means Facilities Construction cost Data recommends a 5% increase to the total cost for the contingencies in final working drawing stage. The reference part of cost data can be viewed in Appendix 12.

### Administrative Costs

the Washington Office guidance is to apply 18% overhead on all projects dealing with 5XXX category. This project will be considered a 5XXX project. For the reference page see Appendix 13.

**TABLE 3.**

Summary of Costs		
Type	Cost (\$/Month)	Cost Cum (\$/Month)
Operating	\$1,450	\$1,450
Equipment	\$10,297	\$11,748
Operator	\$5,390	\$17,138
Travel	\$3,154	\$20,292
Pumps	\$150	\$20,442
Subtotal		\$20,442
Overhead & Profit (15%)	15.00%	\$23,508
Contingency (5%)	3.00%	\$24,213
Administrative (18%)	18.00%	\$28,572
Total Cost for 30 months		\$857,148
Inflate to 2008 Dollars	8%	\$925,721
Total Cost		\$925,721

Inflation values were used on each item Western Mine Cost Services index for Surface Mines, to June 2003

Lease	Rental @ \$1.00 per acre	Royalty 3 Months
UTU-087809	\$2,500.04	
UTU-087810	\$2,527.36	
UTU-087811	\$2,550.61	
UTU-087812	\$2,489.34	
UTU-087813	\$2,560.00	
UTU-087814	\$2,119.81	
UTU-087815	\$2,558.43	
UTU-087816	\$2,318.86	
UTU-087817	\$2,518.64	
UTU-087818	\$2,556.74	
Total	\$24,699.83	\$15,000
Grand Total	\$40,000.00	

Minimum Royalty @\$3 per acre

Acres	24,700	
Minimum Royalty per acre	\$3	
Total Minimum Royalty	\$74,100	

Total Bond \$925,720 +74,100 = \$999,821 or \$1,000,000

Reilly Wendover Summary Federal Bond Coverage, (Reclamation Only):

	Reilly	BLM
Collection Ditch Length	73,200 ft.	79,743 ft
Baffle Length	55,200 ft	58,010 ft
Dike Length	54,900	47,223 ft
Col Ditch Area	270 sq ft	240 sq ft
Baffle Area	72 sq ft	53 sq ft
Dike Area	300 sq ft	296 sq ft
Total Yds.	1,444,200	1,340,401
Production Rate yds/hr	150	291.6
Time Hrs/month	176	173
Time Est. (Months)	54.7	30.6
Equipment Cost \$/month	\$6500/mo	\$9121/mo
Operator Cost \$/month	\$3600/mo	\$4455/mo
Travel Cost \$/month	\$0/mo	\$2027/mo
Operational Cost \$/month	\$0/mo	\$1269/mo
Total Cost per Month	\$10,100	\$16,872
Pumps	\$74	\$131
Total Monthly Cost	\$10,174	\$17,003
Total Cost ('95 Reilly, '94 BLM)	\$556,589	\$520,292
Inflation Factor to May 2001\$	13.00%	15.40%
Total Cost 2001 \$	\$628,945	\$600,417
Overhead & Profit	0.00%	15.00%
Total Cost w/ OH&P	\$628,945	\$690,479
Contingency	1.80%	2.00%
Tot Cost w/Cont	\$640,266	\$704,289
Administrative OH	0.00%	18.00%
Total Cost w/ Ad OH 2001 \$	\$640,266	\$831,061

The Costs for Reilly and BLM are based upon the trespass and represent a direct comparison. Inflation from the Western Mine Cost Service for Surface mines Cost index



Lease	Rental @ \$1.00 per acre	Royalty 3 Months
UTU-087809	\$2,500.04	
UTU-087810	\$2,527.36	
UTU-087811	\$2,550.61	
UTU-087812	\$2,489.34	
UTU-087813	\$2,560.00	
UTU-087814	\$2,119.81	
UTU-087815	\$2,558.43	
UTU-087816	\$2,318.86	
UTU-087817	\$2,518.64	
UTU-087818	\$2,556.74	
Total	\$24,699.83	\$15,000
Grand Total	\$40,000.00	

Total Bond \$807,000 + \$40,000

Total Bond \$847,000

Reilly Royalty backup

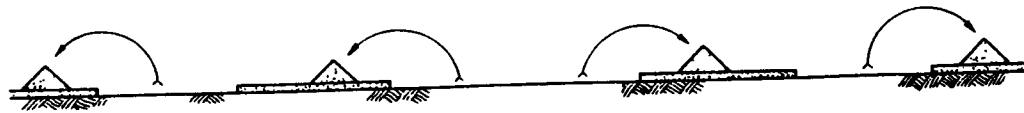
87816														Year	Months	Amount		
99	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec						
JA	319.56	137.68	350.63	408.74	293.71	24.25	2.15	49.11	49.11	92.85	391.94	202.33	2272.95	4553.37	43947.62	48500.99	4	\$12,125
JD	38.62	70.72	109.89	110.56	130.52	95.09	80.21	30.1	64.72	48.64	62.19	60.52	901.78	0.093882	0.906118			
MG	99.16	53.18	55.69	71.91	87.37	92.99	100.23	33.75	30.19	56.31	79.46	78.37	838.61					
MS	37.75	32.31	31.53	22.1	32.15	42.52	42.92	41.1	44.71	23.91	55.69	31.67	438.36					
SA	11.32	4.74	4.13	5.85	4.61	4.35	3.97	8.38	8.5	5.02	13.84	26.96	101.67	4553.37				
98														Year	Months	Amount		
JA	121.43	342.06	374.29	551.45	247.16	48.35	55.11	193.28	206.73	270.89	179.75	114.31	2704.81					
JD	365.19	279.37	409.27	132.45	176.69	146.9	103.93	75.69	66.45	69.44	137.24	108.1	2070.72	6112.75	58998.24	65110.99	4	\$16,278
MG	103.91	43.9	36.79	77.81	72.61	87.78	65.79	52.47	67.08	62.35	69.87	34.76	775.12	0.093882	0.906118			
MS	30.19	39.45	45.41	31.35	42.1	38.77	23.35	40.47	48.39	27.27	38.9	34.98	440.63					
SA	19.84	5.26	5.97	5.01	3.25	2.98	2.87	4.85	11.12	39.12	11.4	9.8	121.47	6112.75			Aprox Avg	\$15,000



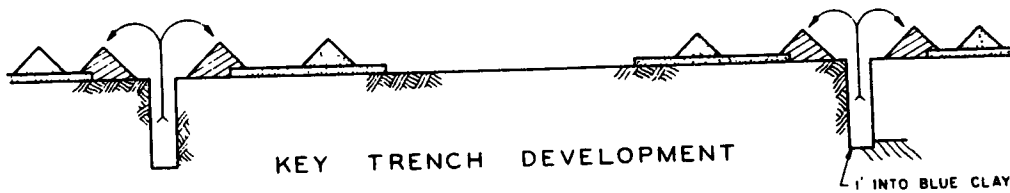
# **APPENDIX 2**

(CROSS SECTIONS OF DITCHES)

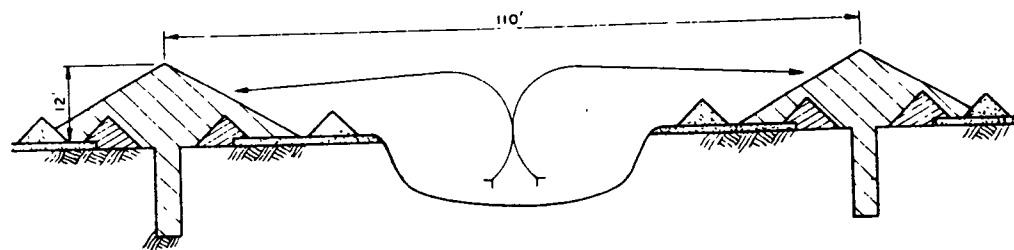
## SEAL DITCH CONSTRUCTION



SALT REMOVAL



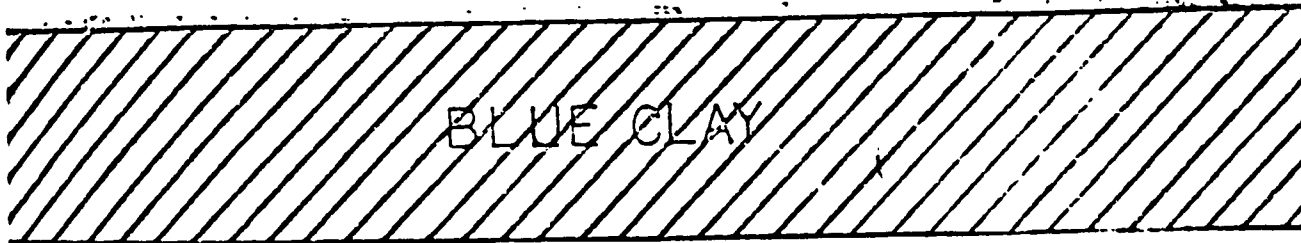
KEY TRENCH DEVELOPMENT



DIKE DEVELOPMENT & FINISH DITCH

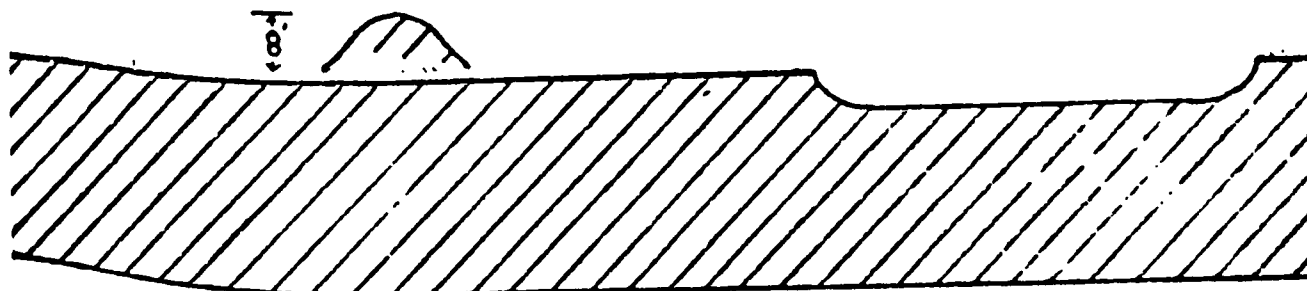
FIGURE III

Gypsum Sand, Salt or Mud



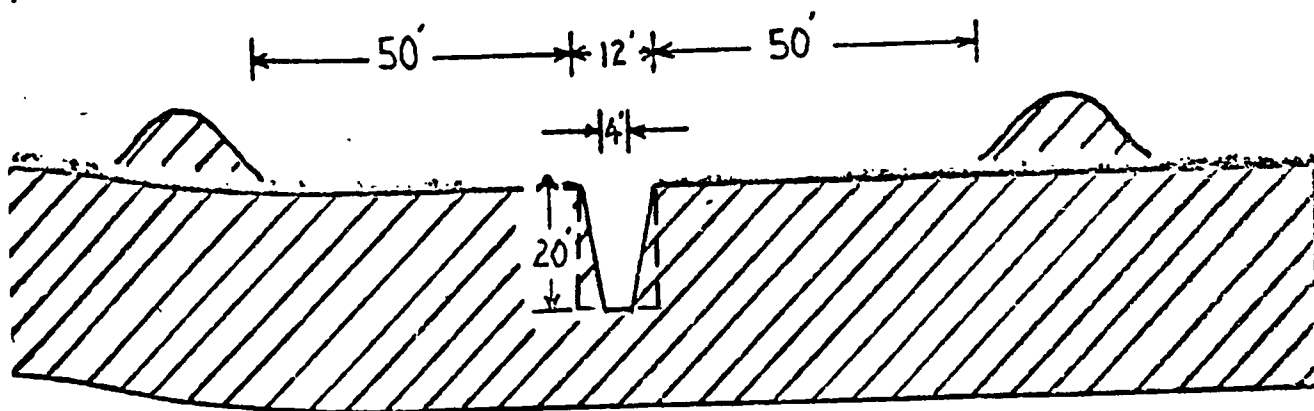
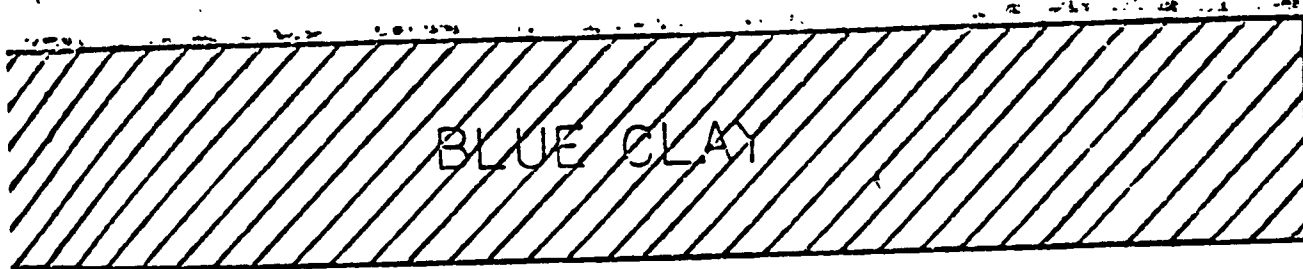
50'

Barrow Pit



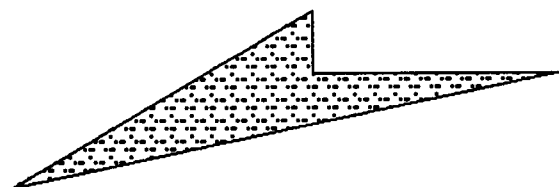
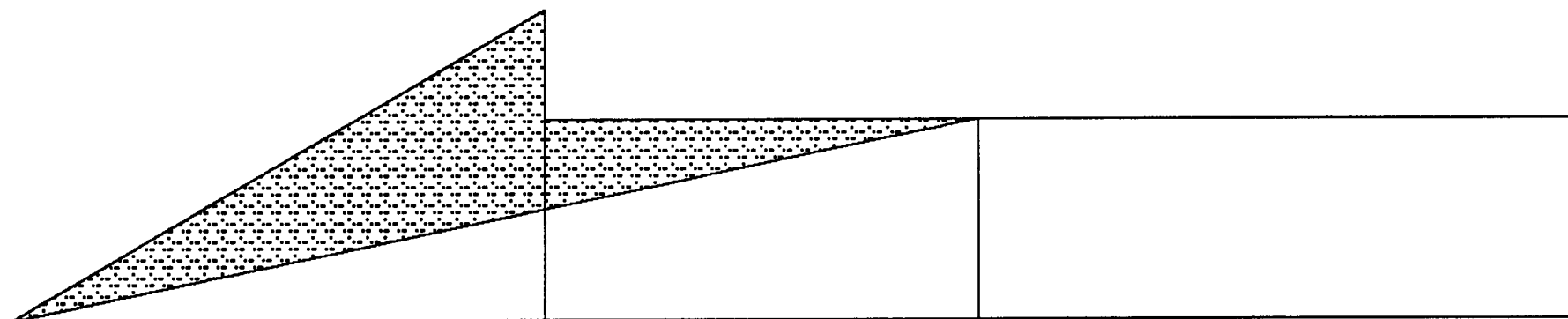
Assumption  $\frac{1}{3}$  of  $160 \text{ ft}^2$  (Original Ditch Area)  
 $= 53 \text{ ft}^2$





~~20 x 12~~ =

20 x 12 = 240 NO TAPER IN Ditch



296 sq ft measure berm, 30 degree angle of repose, 19.75 ft high. Measured 19 Jun'95

# **APPENDIX 3**

(Utah State Dept. Of Highways Analysis)

SALT FLAT INVESTIGATIONS

Progress Report

Parts VI - XIII

In Cooperation with  
Utah State Department of Highways  
and Bureau of Public Roads

Engineering Experiment Station  
College of Engineering

Utah State University  
Logan, Utah

January 1962

Property of  
UTAH GEOLOGICAL & MINERAL SURVEY

1. The car's weight is supported only instantaneously and does not allow sufficient time for the salt to deform by creep nor for the confined soil to consolidate.

2. The tire load causes a three-dimensional rather than a two-dimensional stress pattern and additional support of the tire is developed by the salt to the front and the rear as well as to the sides of the tire. This is not true of the two-dimensional highway stress pattern.

3. It must be recognized that a car is very small in comparison with the road bed, and the loads which might be distributed through the blocks of salt provide a major assist in transferring tire loads to the soil. On the other hand, the blocks of salt are so small in comparison with the size of the roadbed that they may be thought of more in terms of bricks floating in a matrix of mud.

4. Actually the soil beneath the salt has a higher bearing capacity than anticipated. Unconfined compression tests indicate that the bearing capacity of the clay is greater than 10 psi. (Refer to Part VI.) Certainly a strength of 10 psi is adequate to support a highway weighing about 700 pounds per square foot, or about 5 psi. Some unconfined compression tests show bearing capacities less than 10 psi; but in every case the material is not clay, but silt or sand. Loose silt or sand in a saturated state can become quick (liquified) if load is applied instantaneously, but the construction of a highway is not an instantaneous process, and the silt and sand layers will have time to consolidate, and if confined, will certainly carry the load.

### Conclusions

1. The salt crust cannot be depended upon to contribute flexural support for the proposed interstate highway. It can serve no better purpose than fill material and a possible temporary means of distributing loads of equipment and highway fill until consolidation of the soil can be accomplished.

2. If the salt must be used as fill, then it is desirable that it be sealed against groundwater flow. A serious limitation of salt is its instability in the presence of groundwater flow and its tendency to dissolve and re-crystallize thus relieving stresses and reducing the load-carrying capacity. It may be advisable to place a short section of fill on the salt after preliminary soil tests are made. By observing it for a year, the amount of dissolution and recrystallization of the salt may be noted. However, the Western Pacific Railway line has been placed on fill directly on the salt crust. The railroad company's experience and tests on this fill may reveal the necessary information.

# **APPENDIX 4**

(Caterpillar Tractor Specifications)





MODEL	D7H LGP Series II		D8N		D8N LGP		D9N	
Flywheel Power	171 kW	230 hp	212 kW	285 hp	212 kW	285 hp	276 kW	370 hp
Operating Weight*	26 853 kg	59,200 lb	—	—	—	—	42 816 kg	94,196 lb
(Power Shift)	26 853 kg	59,200 lb	—	—	—	—	—	—
(Power Shift Differential Steer)	27 125 kg	59,800 lb	36 842 kg	81,222 lb	36 746 kg	81,025 lb	—	—
Engine Model	3306	3406	3406	3406	3406	3406	3408	3408
Rated Engine RPM	2100	2100	2100	2100	2100	2100	1900	1900
No. of Cylinders	6	6	6	6	6	6	8	8
Bore	121 mm	4.75"	137 mm	5.4"	137 mm	5.4"	137 mm	5.4"
Stroke	152 mm	6"	165 mm	6.5"	165 mm	6.5"	152 mm	6"
Displacement	10.5 L	638 in <sup>3</sup>	14.6 L	893 in <sup>3</sup>	14.6 L	893 in <sup>3</sup>	18 L	1099 in <sup>3</sup>
Track Rollers (Each Side)	7	8	8	8	8	8	8	8
Width of Standard Track Shoe	914 mm	36"	560 mm	22"	965 mm	38"	610 mm	24"
Length of Track on Ground	3175 mm	125"	3.21 m	10'6"	3.20 m	10'6"	3.47 m	11'4.8"
Ground Contact Area (W/Std. Shoe)	5.82 m <sup>2</sup>	9029 in <sup>2</sup>	3.6 m <sup>2</sup>	5580 in <sup>2</sup>	6.2 m <sup>2</sup>	9576 in <sup>2</sup>	4.24 m <sup>2</sup>	6571 in <sup>2</sup>
Track Gauge	2235 mm	88"	2.08 m	6'10"	2.34 m	7'8"	2.25 m	74.6"
GENERAL DIMENSIONS:								
Height (Stripped Top)**	2.55 m	8'4"	2.59 m	8'6"	2.59 m	8'6"	2.93 m	9'7.3"►
Height (To Top of ROPS)	—	—	3.43 m	11'3"	3.43 m	11'3"	—	—
Height (To Top of ROPS Canopy)	3.42 m	11'2.6"	—	—	—	—	3.91 m	12'9.8"►
Height (To Top of Cab ROPS)	3.50 m	11'6"	—	—	—	—	—	—
Overall Length (With SU Blade)	—	—	—	—	—	—	6.87 m	22'6.4"
(Without Blade)	—	—	—	—	—	—	5.17 m	16'11.5"
Overall Length (With P Blade)	5.54 m	18'2"	—	—	—	—	—	—
(Without Blade)	4.62 m	15'2"	—	—	—	—	—	—
Overall Length (With S Blade)	—	—	6.24 m	20'6"	6.24 m	20'6"	—	—
(Without Blade)	—	—	4.93 m	16'2"	4.93 m	16'2"	—	—
Width (Over Trunnions)	3.37 m	11'1"	3.05 m	10'	3.55 m	11'7"	2.93 m	9'7"
Width (W/O Trunnions — Std. Shoe)	3.15 m	10'4"	2.7 m	8'8"	—	—	2.89 m	9'5.9"
Width (With Standard Shoe)	—	—	—	—	3.37 m	10'10"	—	—
Ground Clearance	488 mm	19.2"	528 mm	20.8"	519 mm	20.4"	505 mm	19.9"■
Blade Types and Widths:								
Straight	4.49 m	14'9"	—	—	—	—	—	—
Angle Straight	—	—	4.96 m	16'3"	—	—	—	—
Universal	—	—	4.26 m	14'0"	3.94 m	12'11"	4.66 m	15'3.4"
Semi-U	—	—	3.94 m	12'11"	4.52 m	14'10"	4.32 m	14'1.94"
Fuel Tank Refill Capacity	479 L	127 U.S. gal	488 L	129 U.S. gal	488 L	129 U.S. gal	731 L	193 U.S. gal

\*Operating Weight includes ROPS canopy, operator, lubricants, coolant, full fuel tank, hydraulic controls and fluids, semi universal with tilt, back-up alarm, seat belt, lights, rigid drawbar and front towing device

— D8N equipped with track guides, 635 mm (24") MS shoes, single shank ripper and subblade

— D9N include track guides

\*\*Height (stripped top) — without ROPS canopy, exhaust, seat back or other easily removed encumbrances

►Dimensions to flat of shoe. For dimensions to grouser tips add 84 mm (3.3") for D9N

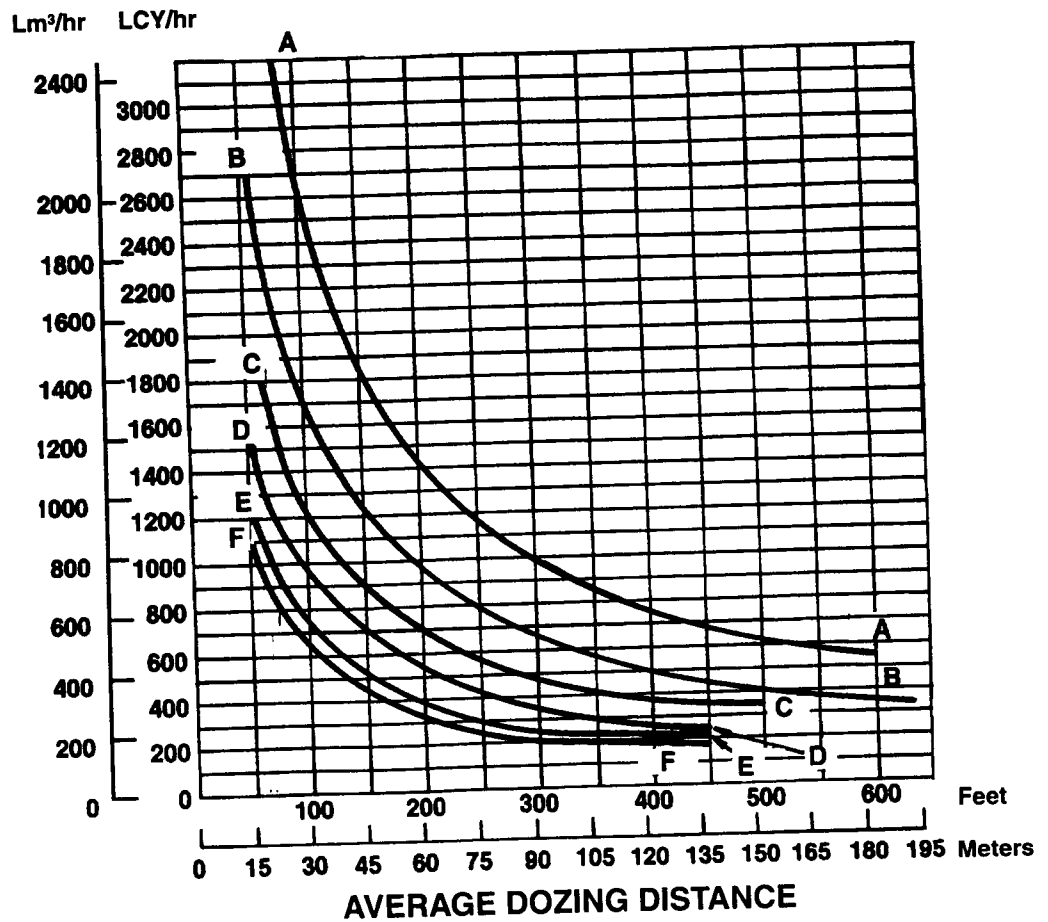
Note: D8N LGP is offered as a custom product

■SAE J1234

# **APPENDIX 5**

(Tractor Production Estimation Using “U” Blade)

**ESTIMATED DOZING PRODUCTION • Universal Blades • D7G through D11N**



**KEY**

- A — D11N-11U
- B — D10N-10U
- C — D9N-9U
- D — D8N-8U
- E — D7H-7U
- F — D7G-7U

**NOTE:** This chart is based on numerous field studies made under varying job conditions. Refer to correction factors following these charts

**KEY**  
 A -  
 B -  
 C -  
 D -  
 E -  
 F -  
 G

# Job Factors Estimating Production Off-The-Job • Example Problem

## Bulldozers

1

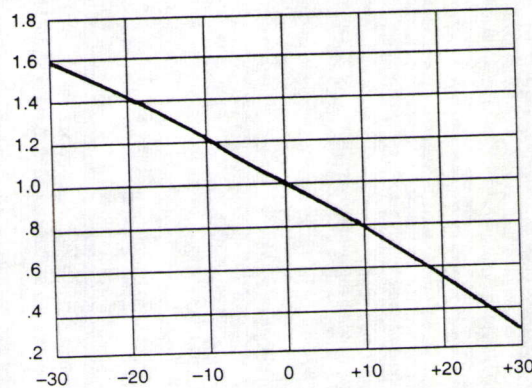
### JOB CONDITION CORRECTION FACTORS

	TRACK- TYPE TRACTOR	WHEEL- TYPE TRACTOR
<b>OPERATOR —</b>		
Excellent	1.00	1.00
Average	0.75	0.60
Poor	0.60	0.50
<b>MATERIAL —</b>		
Loose stockpile	1.20	1.20
Hard to cut; frozen —		
with tilt cylinder	0.80	0.75
without tilt cylinder	0.70	—
cable controlled blade	0.60	—
Hard to drift; "dead" (dry, non-cohesive material) or very sticky material	0.80	0.80
ripped or blasted	0.60-0.80	—
<b>DOZING</b>	1.20	1.20
<b>SLOT DOZING</b>	1.15-1.25	1.15-1.25
<b>VISIBILITY —</b>		
Dust, rain, snow, fog or darkness	0.80	0.70
<b>JOB EFFICIENCY —</b>		
50 min/hr	0.83	0.83
40 min/hr	0.67	0.67
<b>DIRECT DRIVE TRANSMISSION</b> (0.1 min. fixed time)	0.80	—
<b>BULLDOZER*</b>		
Adjust based on SAE capacity relative to the base blade used in the Estimated Dozing Production graphs.		
<b>GRADES —</b> See following graph.		

\*Note: Angling blades and cushion blades are not considered production dozing tools. Depending on job conditions, the A-blade and C-blade will average 50-75% of straight blade production.

### % Grade vs. Dozing Factor

(-) Downhill  
(+) Uphill



### ESTIMATING DOZER PRODUCTION OFF-THE-JOB

#### Example problem:

Determine average hourly production of a D8N/8SU (with tilt cylinder) moving hard-packed clay an average distance of 45 m (150 feet) down a 15% grade, using a slot dozing technique.

Estimated material weight is 1600 kg/Lm<sup>3</sup> (2650 lb/LCY). Operator is average. Job efficiency is estimated at 50 min/hr.

Uncorrected Maximum Production — 458 Lm<sup>3</sup>/h (600 LCY/hr) (example only)

Applicable Correction Factors:

Hard-packed clay is "hard to cut" material -0.80  
 Grade correction (from graph) .....-1.30  
 Slot dozing .....-1.20  
 Average operator .....-0.75  
 Job efficiency (50 min/hr) .....-0.83  
 Weight correction .....(2300/2650)-0.87

Production = Maximum Production × Correction Factors

$$= (600 \text{ LCY/hr}) (0.80) (1.30) (1.20) (0.75) (0.83) (0.87) = 405.5 \text{ LCY/hr}$$

To obtain production in metric units, the same procedure is used substituting maximum uncorrected production in Lm<sup>3</sup>.

$$= 458 \text{ Lm}^3/\text{h} \times \text{Factors} = 309.6 \text{ Lm}^3/\text{h}$$

# **APPENDIX 6**

(Material Density from Caterpillar Handbook)

# Tables

WEIGHT* OF MATERIALS	LOOSE		BANK		LOAD FACTORS
	kg/m³	lb/yd³	kg/m³	lb/yd³	
Basalt .....	1960	3300	2970	5000	.67
Bauxite, Kaolin .....	1420	2400	1900	3200	.75
Caliche .....	1250	2100	2260	3800	.55
Carnotite, uranium ore .....	1630	2750	2200	3700	.74
Cinders .....	560	950	860	1450	.66
Clay — Natural bed .....	1660	2800	2020	3400	.82
Dry .....	1480	2500	1840	3100	.81
Wet .....	1660	2800	2080	3500	.80
Clay & gravel — Dry .....	1420	2400	1660	2800	.85
Wet .....	1540	2600	1840	3100	.85
Coal — Anthracite, Raw .....	1190	2000	1600	2700	.74
Washed .....	1100	1850			.74
Ash, Bituminous Coal .....	530-650	900-1100	590-890	1000-1500	.93
Bituminous, Raw .....	950	1600	1280	2150	.74
Washed .....	830	1400			.74
Decomposed rock —					
75% Rock, 25% Earth .....	1960	3300	2790	4700	.70
50% Rock, 50% Earth .....	1720	2900	2280	3850	.75
25% Rock, 75% Earth .....	1570	2650	1960	3300	.80
Earth — Dry packed .....	1510	2550	1900	3200	.80
Wet excavated .....	1600	2700	2020	3400	.79
Loam .....	1250	2100	1540	2600	.81
Granite — Broken .....	1660	2800	2730	4600	.61
Gravel — Pitrun .....	1930	3250	2170	3650	.89
Dry .....	1510	2550	1690	2850	.89
Dry 6-50 mm (1/4"-2") .....	1690	2850	1900	3200	.89
Wet 6-50 mm (1/4"-2") .....	2020	3400	2260	3800	.89
Gypsum — Broken .....	1810	3050	3170	5350	.57
Crushed .....	1600	2700	2790	4700	.57
Hematite, iron ore, high grade .....	1810-2450	4000-5400	2130-2900	4700-6400	.85
Limestone — Broken .....	1540	2600	2610	4400	.59
Crushed .....	1540	2600	—	—	—
Magnetite, iron ore .....	2790	4700	3260	5500	.85
Pyrite, iron ore .....	2580	4350	3030	5100	.85
Sand — Dry, loose .....	1420	2400	1600	2700	.89
Damp .....	1690	2850	1900	3200	.89
Wet .....	1840	3100	2080	3500	.89
Sand & clay — Loose .....	1600	2700	2020	3400	.79
Compacted .....	2400	4050			
Sand & gravel — Dry .....	1720	2900	1930	3250	.89
Wet .....	2020	3400	2230	3750	.91
Sandstone ..	1510	2550	2520	4250	.60
Shale .....	1250	2100	1660	2800	.75
Slag — broken .....	1750	2950	2940	4950	.60
Snow — Dry .....	130	220			
Wet .....	520	860			
Stone — crushed .....	1600	2700	2670	4500	.60
Taconite .....	1630-1900	3600-4200	2360-2700	5200-6100	.58
Top Soil .....	950	1600	1370	2300	.70
Taprock — broken .....	1750	2950	2610	4400	.67
Wood Chips** .....	—	—	—	—	—

\*Varies with moisture content, grain size, degree of compaction, etc. Tests must be made to determine exact material characteristics.

\*\*Weights of commercially important wood species can be found in the last pages of the Logging & Forest Products section. To obtain wood weights use the following equations: lb/yd³ = (lb/ft³) × .4 × 27  
kg/m³ = (kg/m³) × .4



# **APPENDIX 7**

(Operating Costs for Lubrication & Fuel Consumption)

## QUICK ESTIMATOR TABLE

- Approximate hourly cost (\$ U.S.) of lube oils, filters and grease (materials).
- Approximate hourly cost (\$ U.S.) of lube oils, filters and grease (labor).

Computed over 2000 hour period.

## FACTORS USED (Labor)

For the labor figure shown we assumed an hourly labor rate of \$40.00\*. This rate was applied to the assumed labor times of:

- 30 minutes per lube oil change
- 5 minutes per filter change
- 1 minute per grease fitting

\*\$50.00 for D4H thru D7H.

## FACTORS USED (Materials)

- Lube oils at U.S. \$3.50\* per U.S. gallon. (Capacities and change intervals from each model's Lube and Maintenance Guide.)
- Filters at suggested U.S. consumer's list price (See previous page for filter computation formula.)
- Grease at \$.04 per fitting. (See consumption tables for each model's number of fittings over 2000 hour period.)

\*\$6.35 per gallon on D4H thru D7H

Model	Approx. Cost Per Hour		Model	Approx. Cost Per Hour		Model	Approx. Cost Per Hour	
	Materials	Labor		Materials	Labor		Materials	Labor
<b>Track-Type Tractors</b>			<b>Backhoe Loaders</b>			<b>Articulated Trucks</b>		
D3C Series III	.15	.08	416B	.39	2.92	D20D		.48
D4C Series III	.15	.08	426B	.39	2.92	D25D		.48
D5C Series III	.20	.08	428B	.39	2.92	D30D		.48
D4H Series II & III	.37	.34	436B	.39	2.92	D40D		.49
D5H Series II	.47	.25	438B	.39	2.92	D250D		.48
D6D & D6E	.45	.26	446B	.54	3.84	D300D		.48
D6H Series II	.55	.22	<b>Skidders</b>			D350D		.50
D7G	.50	.46	518C	.24	.17	D400D		.67
D7H Series II	.49	.19	528B	.30	.17	<b>Wheel Tractors &amp; Compactors</b>		
D8L	.61		530B	.33	.17	814B		.38
D8N	.53	.10	<b>Pipelayers</b>			815B		.39
D9N	.75	.31	571G	.41	.97	816B		.39
D10N	.86	.32	572G	.51	.91	824C		.45
D11N	1.15	.28	578	—	—	825C		.47
<b>Agricultural Tractors</b>			589	.83	.56	826C		.47
D4E SR	.20	.20	<b>Wheel Tractor-Scrapers</b>			834B		.72
D6E SR	.31	.16	613C Series II	.42	1.20	<b>Wheel Loaders &amp; Integrated Toolcarriers</b>		
Challenger 65C	.61	.28	615C Series II	.52	1.32	910F (3F-3R)		.19
Challenger 70C	.61	.28	621F	.60	.54	IT12F		.18
Challenger 75C	.61	.28	623F	.66	1.27	918F		.20
Challenger 85C	.61	.28	627F	.86	.66	IT18F		.20
<b>Motor Graders</b>			631E Series II	.72	.64	928F		.25
120G	.33	.18	633E	.80	1.27	IT28F		.25
130G	.36	.18	637E Series II	.95	.74	930T		.28
12G	.32	.16	651E	1.11	.77	936F		.32
140G	.39	.18	657E	1.41	1.07	938		.31
14G	.52	.18	<b>Construction &amp; Mining Trucks &amp; Tractors</b>			950F Series II		.34
16G	.61	.18	768C	1.17	.53	960F		.34
<b>Excavators</b>			769C	1.17	.42	966F Series II		.44
214B	.34	.82	771C	1.17	.42	970F		.45
307	.70	.43	772B	1.29	.53	980F		.52
311	.62	.45	773B	1.29	.42	988F		1.06
312	.63	.45	775B	1.29	.53	990		1.60
315	.60	.46	776C	1.51	.56	992D		1.57
320 (3066)	.76	.46	777C	1.51	.45	994		2.82
320 (3116)	.83	.46	784B	1.89	.59	<b>Track Loaders</b>		
322	1.09	.46	785B	1.89	.59	933		.22
325	.73	.46	789B	2.55	.61	939		.26
330	.80	.46	793B	3.46	.63	953B		.26
350	1.58	.83				963		.24
375	2.19	.85				973		.24
5080	NA							
5130	NA							

\*Includes coolant maintenance costs

Note: These figures are based upon machines operating in ideal conditions with normal lubricant usage. Keep in mind they are approximate hourly costs. Your figures may vary depending upon condition, application severity and local labor rates. By using prices more common in your region, and with the assistance of your Caterpillar dealer representative, you can estimate a more accurate hourly cost for lube oils, filters and grease.

# FUEL CONSUMPTION TABLES & LOAD FACTOR GUIDES... (H214)

## TRACK-TYPE TRACTORS

Model	Low		Medium		High	
	liter	U.S. gal	liter	U.S. gal	liter	U.S.
D3C & LGP Series III	4-7½	1-2	7½-11	2-3	9½-13	2½-3
D4C & LGP Series III	5½-9½	1½-2½	9½-13	2½-3½	11-15	3-4
D5C & LGP Series III	5½-9½	1½-2½	9½-13	2½-3½	13-17	3½-4½
D4E	5½-9½	1½-2½	9½-13	2½-3½	11-15	3-4
D4H Series II	6-10½	1½-3	10½-14½	3-4	12½-17	3½-4½
D4H XL & LGP Series III	6-10½	1½-3	10½-14½	3-4	12½-17	3½-4½
D5B	9½-13	2½-3½	11-17	3-4½	15-21	4-5
D5H Series II, XL & LGP	11-15	3-4	12½-19½	3½-5	17-24	4½-5½
D6D & LGP	11-19	3-5	15-21	4-5½	21-26	5-6
D6E	11-20½	3½-5	15½-21	4-6	23-28½	6-7
D6H Series II, XL, XR & LGP	13-22½	3½-6	17½-25	4½-6½	25-30½	6½-7½
D7G Series II*	19-25	5-6½	26-34	7-9	32-40	8½-10
D7H Series II, XR & LGP	19-23	5-6	25-28	6½-7½	32-36	8½-10
D8N & LGP	23-28	6-7½	28-38	7½-10	38-51	10-13
D9N	32-44	8½-11½	44-53	11½-14	52-69	14½-18
D10N	44-59	11½-15½	59-76	15½-20	76-93	20-23
D11N	62-87	16½-23	87-112	23-29½	112-134	29½-33

\*D7G fuel consumption data is based on a precombustion chamber equipped engine. Fuel consumption for a direct injection equipped D7G should be approximately 10% less.

## AGRICULTURAL TRACTORS

Model	Low		Medium		High	
	liter	U.S. gal	liter	U.S. gal	liter	U.S.
D4E SR	5½-9½	1½-2½	9½-13	2½-3½	11-15	3-4
D6E SR	11-19	3-5	15-21	4-5½	21-26	5½-6½
Challenger 35	**	**	**	**	**	**
Challenger 45	**	**	**	**	**	**
Challenger 65C	30-38	8-10	38-46	10-12	46-53	12-13½
Challenger 70C	30-38	8-10	38-46	10-12	46-53	12-13½
Challenger 75C	34-42	9-11	42-49	11-13	49-57	13-14½
Challenger 85C	34-42	9-11	42-49	11-13	49-57	13-14½

\*\*Insufficient data

## LOAD FACTOR GUIDE

- High:** Steady ripping, shuttle pushloading and downhill dozing. Agricultural drawbar work at full throttle, engine lugged to max. power most of the time; Little or no idling or travel in reverse.
- Medium:** Production dozing, pulling scrapers, most pushloading. Agricultural drawbar work at full throttle but not always lugging engine. Some idling and some travel with no load.
- Low:** Considerable idling or travel with no load.

# **APPENDIX 8**

(Equipment Rental Rates)

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**RENTAL RATE BLUE BOOK**

**FOR**

**CONSTRUCTION EQUIPMENT**

**VOLUME 1**

**§9 TRACTORS & EARTHMOVING**

4/96 replaces 4/95

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# TRACTORS & EARTHMOVING

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NOTE: The cost breakdown under "Estimated Operating Cost \$/Hr." in this section is compatible with the amounts shown under "Total Operating Cost \$/Hour" in Section 9, also dated 4/96, of the *Cost Reference Guide for Construction Equipment*.

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# TRACTORS & EARTHMOVING

## USING THE *BLUE BOOK* FOR FEDERALLY FUNDED PROJECTS

Although these procedures are mandatory on federally funded projects, they may be used in any project where replacement cost allowances in depreciation are not desired.

Federal cost principles state that depreciation costs may not include replacement cost allowances and must be indexed to the original purchase price of a machine or a reasonable estimate of the original purchase price.

To make the rates in this guide comply with federal cost principles, use the Rate Adjustment Tables and follow the instructions on page 1-4 of Section 1, "INTRODUCTION." The "adjusted *Blue Book* rate" will have its depreciation base indexed to the year your machine was originally manufactured and sold and will not include an allowance for replacement costs.

### RATE ADJUSTMENT TABLES

Table 1: (1987-1996)

EQUIPMENT TYPES	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
RIGID FRAME GRADERS	.927	.934	.939	.949	.955	.965	.972	.986	.994	1.000
ARTICULATED FRAME GRADERS	.901	.911	.917	.931	.939	.953	.962	.981	.993	1.000
GRADER ATTACHMENTS	.847	.861	.871	.893	.905	.927	.941	.971	.988	1.000
CRAWLER LOADERS	.911	.916	.931	.945	.953	.961	.969	.980	.990	1.000
CRAWLER LOADER ATTACHMENTS	.860	.871	.889	.911	.924	.938	.950	.968	.984	1.000
SKID STEER LOADERS	.958	.963	.966	.970	.976	.980	.988	.992	.997	1.000
INDUSTRIAL TRACTORS	.942	.947	.950	.956	.964	.969	.980	.989	.997	1.000
-WD ARTICULATED WHEEL LOADERS	.917	.924	.932	.945	.954	.964	.974	.985	.992	1.000
NON-ARTICULATED WHEEL LOADERS	.937	.942	.948	.958	.965	.973	.980	.989	.994	1.000
WHEEL LOADER ATTACHMENTS	.866	.875	.888	.910	.924	.941	.957	.975	.987	1.000
CONVENTIONAL SCRAPERS	.915	.923	.927	.938	.944	.955	.962	.976	.994	1.000
ELEVATING SCRAPERS	.914	.921	.926	.937	.943	.954	.961	.976	.994	1.000
CRAWLER DOZERS	.908	.917	.932	.946	.955	.963	.969	.980	.990	1.000
SPECIAL APPLICATION CRAWLER TRACTORS	.916	.924	.938	.951	.959	.967	.972	.982	.991	1.000
PIPELAYERS	.944	.950	.959	.967	.973	.978	.981	.988	.994	1.000
CRAWLER TRACTOR ATTACHMENTS	.874	.884	.900	.920	.932	.944	.955	.971	.985	1.000
WHEEL DOZERS	.937	.943	.947	.953	.961	.967	.979	.989	.996	1.000

# TRACTORS & EARTHMOVING

Table 2: (1977-1986)

EQUIPMENT TYPES	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
RIGID FRAME GRADERS	.847	.854	.866	.875	.890	.904	.918	.922	.922	.926
ARTICULATED FRAME GRADERS	.793	.802	.818	.831	.851	.870	.888	.894	.894	.900
GRADER ATTACHMENTS	.678	.693	.717	.737	.768	.797	.826	.835	.835	.844
CRAWLER LOADERS	.819	.835	.849	.866	.883	.896	.900	.900	.900	.905
CRAWLER LOADER ATTACHMENTS	.703	.720	.739	.746	.780	.801	.817	.829	.853	.853
SKID STEER LOADERS	.866	.879	.893	.911	.930	.939	.940	.946	.954	.954
INDUSTRIAL TRACTORS	.805	.820	.838	.858	.882	.908	.921	.922	.931	.941
4-WD ARTICULATED WHEEL LOADERS	.777	.794	.812	.838	.877	.896	.901	.903	.905	.912
NON-ARTICULATED WHEEL LOADERS	.831	.844	.858	.878	.907	.921	.925	.926	.928	.933
WHEEL LOADER ATTACHMENTS	.616	.641	.669	.699	.743	.808	.839	.848	.851	.854
CONVENTIONAL SCRAPERS	.832	.840	.852	.861	.877	.891	.905	.910	.910	.914
ELEVATING SCRAPERS	.829	.836	.848	.859	.874	.889	.903	.908	.908	.912
CRAWLER DOZERS	.816	.832	.845	.863	.880	.893	.897	.897	.897	.902
SPECIAL APPLICATION CRAWLER TRACTORS	.832	.846	.859	.875	.890	.902	.906	.906	.906	.910
PIPELAYERS	.888	.898	.906	.917	.927	.935	.938	.938	.938	.940
CRAWLER TRACTOR ATTACHMENTS	.733	.748	.765	.772	.802	.821	.836	.846	.867	.867
WHEEL DOZERS	.804	.823	.844	.869	.896	.910	.911	.921	.931	.931



# TRACTORS & EARTHMOVING

## RATE ELEMENT TABLE

The Rate Element Table is designed to allow for greater accuracy when adjusting *Blue Book* rates and identifying specific cost allowances contained in the rates. The basic *Blue Book* rate contains allowances for depreciation, major overhaul repairs, cost of facilities capital (Cfc), and indirect costs. These tables show the percentage of the total *Blue Book* rate that each cost allowance comprises. See Section 1, "INTRODUCTION", for a complete explanation of the Rate Element Table and sample applications.

EQUIPMENT TYPES	DEPRECIATION	MAJOR OVERHAUL	CFC	INDIRECT COSTS
RIGID FRAME GRADERS	.27	.45	.17	.11
ARTICULATED FRAME GRADERS	.35	.33	.18	.14
GRADER ATTACHMENTS	.54	.22	.12	.12
CRAWLER LOADERS	.33	.43	.14	.10
CRAWLER LOADER ATTACHMENTS	.48	.26	.13	.13
SKID STEER LOADERS	.26	.55	.11	.08
INDUSTRIAL TRACTORS	.35	.33	.18	.14
4-WD ARTICULATED WHEEL LOADERS	.40	.26	.20	.14
NON-ARTICULATED WHEEL LOADERS	.31	.47	.12	.10
WHEEL LOADER ATTACHMENTS	.65	.13	.12	.10
CONVENTIONAL SCRAPERS	.29	.42	.17	.12
ELEVATING SCRAPERS	.30	.45	.16	.09
CRAWLER DOZERS	.32	.40	.16	.12
SPECIAL APPLICATION CRAWLER TRACTORS	.31	.44	.16	.09
PIPELAYERS	.20	.40	.20	.20
CRAWLER TRACTOR ATTACHMENTS	.49	.31	.11	.09
WHEEL DOZERS	.39	.30	.19	.12

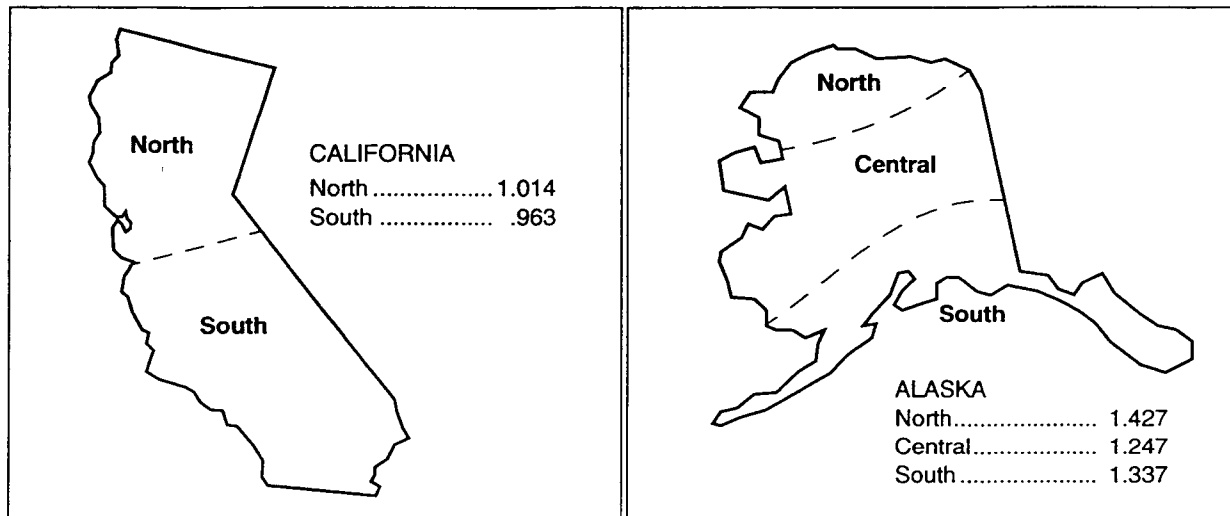
# TRACTORS & EARTHMOVING

## REGIONAL ADJUSTMENT MAPS

The following regional adjustments may be used to modify the average equipment rates shown in this section. These adjustments reflect regional variations in factors that affect equipment ownership costs. Adjustments for extreme variations within regions should be considered separately. To make regional adjustments, multiply the average rate by the factor listed for the specific region. For example:

Average Monthly Rate	= \$550.00
Regional Adjustment Factor	= <u>x 1.07</u>
Adjusted Monthly Rate	= \$588.50

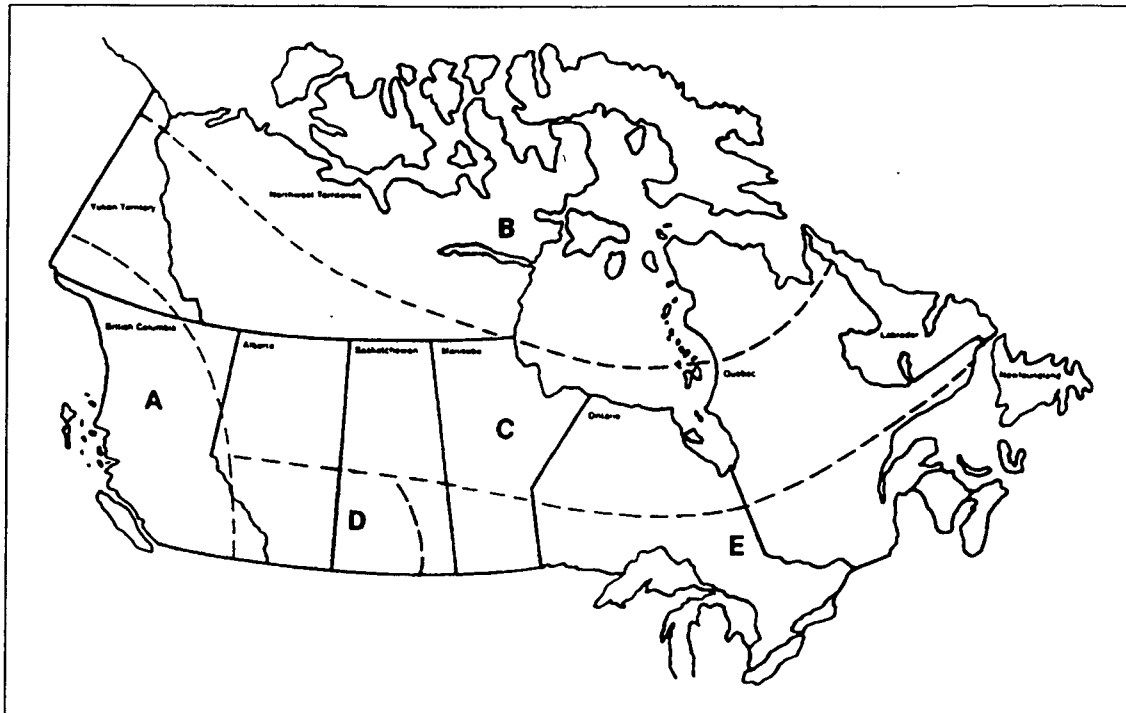
Regional adjustment factors apply only to the rental rates; they are not meant to be adjustments to the "Estimated Operating Cost \$/Hr." For a complete statement on the *Regional Adjustment Maps*, see Section 1, "INTRODUCTION."



STATES		Adjustment
Alabama.....		.926
Alaska - North .....		1.427
Central.....		1.247
South.....		1.337
Arizona.....		.875
Arkansas.....		.918
California - North .....		1.014
South.....		.963
Colorado.....		.919
Connecticut.....		1.037
Delaware.....		.952
District of Columbia.....		.960
Florida.....		.951
Georgia.....		.932
Hawaii.....		1.016
Idaho.....		.873
Illinois.....		1.014
Indiana.....		.985
Iowa.....		.951
Kansas.....		.937
Kentucky.....		.970
Louisiana.....		.942
Maine.....		.945
Maryland.....		.929
Massachusetts.....		1.031
Michigan.....		1.012
Minnesota.....		1.112
Mississippi.....		.919
Missouri.....		.978
Montana.....		1.012
Nebraska.....		.912
Nevada.....		.941
New Hampshire.....		.929
New Jersey.....		.962
New Mexico.....		.822
New York.....		1.079
North Carolina.....		.919
North Dakota.....		.990
Ohio.....		.996
Oklahoma.....		.918
Oregon.....		.938
Pennsylvania.....		1.040
Rhode Island.....		1.021
South Carolina.....		.909
South Dakota.....		1.002
Tennessee.....		.930
Texas.....		.889
Utah.....		.865
Vermont.....		.937
Virginia.....		.949
Washington.....		.978
West Virginia.....		.993
Wisconsin.....		1.080
Wyoming.....		1.027
ISLANDS		Adjustment
Guam.....		1.040
Marshall Islands.....		1.046
Puerto Rico.....		.906
Virgin Islands.....		.906

# TRACTORS & EARTHMOVING

## REGIONAL ADJUSTMENT MAPS



CANADA	
REGIONS	Adjustment
A .....	1.24
B .....	1.63
C .....	1.34
D .....	1.18
E .....	1.20

# TRACTORS & EARTHMOVING

## LGP CRAWLER DOZERS (continued)

Model (Yr.Disc.)	Dozer Type	Operator Protection	HP	Monthly \$	Weekly \$	Daily \$	Hourly \$	Estimated Operating Cost \$/Hr.
<b>DIESEL POWERED (CONT.)</b>								
<b>CATERPILLAR</b>								
D3C LGP (1991)	Power Angle Tilt	EROPS	67.0	2,870.00	805.00	200.00	30.00	9.00
D3C LGP (1991)	Power Angle Tilt	ROPS	67.0	2,685.00	750.00	190.00	29.00	8.75
D3C LGP (1991)	Power Tilt Outside	EROPS	67.0	2,855.00	800.00	200.00	30.00	9.00
D3C LGP (1991)	Power Tilt Outside	ROPS	67.0	2,670.00	750.00	190.00	29.00	8.70
D3C LGP SERIES II (1994)	Power Angle Tilt	EROPS	70.0	3,185.00	890.00	225.00	34.00	9.35
D3C LGP SERIES II (1994)	Power Angle Tilt	ROPS	70.0	2,985.00	835.00	210.00	32.00	9.10
D3C SERIES III LGP	Power Angle Tilt	ROPS	71.0	3,285.00	920.00	230.00	35.00	9.35
D3CS LGP (1991)	Straight Power Tilt	EROPS	65.0	3,170.00	890.00	225.00	34.00	9.30
D3CS LGP (1991)	Straight Power Tilt	ROPS	65.0	2,985.00	835.00	210.00	32.00	9.00
D3CS LGP SERIES II (1994)	Straight Power Tilt	EROPS	70.0	3,805.00	1,065.00	265.00	40.00	10.10
D3CS LGP SERIES II (1994)	Straight Power Tilt	ROPS	70.0	3,605.00	1,010.00	255.00	38.00	9.85
D4C LGP (1991)	Power Angle Tilt	EROPS	78.0	3,175.00	890.00	225.00	34.00	9.85
D4C LGP (1991)	Power Angle Tilt	ROPS	78.0	2,985.00	835.00	210.00	32.00	9.60
D4C LGP SERIES II (1994)	Power Angle Tilt	EROPS	80.0	3,505.00	980.00	245.00	37.00	10.10
D4C LGP SERIES II (1994)	Power Angle Tilt	ROPS	80.0	3,305.00	925.00	230.00	35.00	9.85
D4C SERIES III LGP	Power Angle Tilt	EROPS	81.0	3,935.00	1,100.00	275.00	41.00	10.60
D4C SERIES III LGP	Power Angle Tilt	ROPS	81.0	3,625.00	1,015.00	255.00	38.00	10.20
D4H LGP SERIES II (1992)	Power Angle Tilt	EROPS	90.0	3,715.00	1,040.00	260.00	39.00	10.90
D4H LGP SERIES II (1992)	Power Angle Tilt	ROPS	90.0	3,480.00	975.00	245.00	37.00	10.55
D4H LGP SERIES II (1992)	Straight	EROPS	90.0	3,680.00	1,030.00	260.00	39.00	10.85
D4H LGP SERIES II (1992)	Straight	ROPS	90.0	3,450.00	965.00	240.00	36.00	10.50
D4H LGP SERIES III	Power Angle Tilt	EROPS	105.0	4,355.00	1,220.00	305.00	46.00	12.20
D4H LGP SERIES III	Power Angle Tilt	ROPS	105.0	4,040.00	1,130.00	285.00	43.00	11.75
D5C LGP (1993)	Power Angle Tilt	EROPS	90.0	3,455.00	965.00	240.00	36.00	10.60
D5C LGP (1993)	Power Angle Tilt	ROPS	90.0	3,265.00	915.00	230.00	35.00	10.35
D5C SERIES III LGP	Power Angle Tilt	EROPS	91.0	4,025.00	1,125.00	280.00	42.00	11.15
D5C SERIES III LGP	Power Angle Tilt	ROPS	91.0	3,720.00	1,040.00	260.00	39.00	10.75
D5H LGP SERIES II	Power Angle Tilt	EROPS	130.0	6,160.00	1,725.00	430.00	65.00	15.40
D5H LGP SERIES II	Power Angle Tilt	ROPS	130.0	5,890.00	1,650.00	415.00	62.00	15.00
D6H DS LGP SERIES II	Straight	EROPS	165.0	7,505.00	2,100.00	525.00	79.00	18.90
D6H DS LGP SERIES II	Straight	ROPS	165.0	7,205.00	2,015.00	505.00	76.00	18.45
D6H LGP SERIES II	Straight	EROPS	165.0	7,110.00	1,990.00	500.00	75.00	18.50
D6H LGP SERIES II	Straight	ROPS	165.0	6,810.00	1,905.00	475.00	71.00	18.05
D7H DS LGP SERIES II	Straight	EROPS	215.0	11,210.00	3,140.00	785.00	120.00	25.80
D7H DS LGP SERIES II	Straight	ROPS	215.0	10,825.00	3,030.00	760.00	115.00	25.25
D7H LGP SERIES II	Straight	EROPS	215.0	11,030.00	3,090.00	775.00	115.00	25.35
D7H LGP SERIES II	Straight	ROPS	215.0	10,645.00	2,980.00	745.00	110.00	24.75
<b>DEERE</b>								
750B LGP (1995)	Straight	EROPS	120.0	5,480.00	1,535.00	385.00	58.00	14.30
750B LGP (1995)	Straight	ROPS	120.0	5,235.00	1,465.00	365.00	55.00	13.95
750C LGP	Straight	EROPS	140.0	5,765.00	1,615.00	405.00	61.00	15.55
750C LGP	Straight	ROPS	140.0	5,435.00	1,520.00	380.00	57.00	15.15
850B LGP (1995)	Straight	EROPS	165.0	6,540.00	1,830.00	460.00	69.00	18.00
850B LGP (1995)	Straight	ROPS	165.0	6,205.00	1,735.00	435.00	65.00	17.50
850C LGP	Straight	EROPS	180.0	7,160.00	2,005.00	500.00	75.00	19.00
850C LGP	Straight	ROPS	180.0	6,800.00	1,905.00	475.00	71.00	18.55
<b>DRESSER</b>								
TD12 LGP (1991)	Straight	EROPS	125.0	4,685.00	1,310.00	330.00	50.00	14.00
TD12 LGP (1991)	Straight	ROPS	125.0	4,415.00	1,235.00	310.00	47.00	13.65
TD12C LGP	Straight	EROPS	125.0	5,850.00	1,640.00	410.00	62.00	14.85
TD12C LGP	Straight	ROPS	125.0	5,530.00	1,550.00	390.00	59.00	14.40
TD15C LGP (1991)	Straight	ROPS	140.0	5,440.00	1,525.00	380.00	57.00	16.05
TD15E LGP	Straight	EROPS	165.0	7,570.00	2,120.00	530.00	80.00	19.30
TD15E LGP	Straight	ROPS	165.0	7,280.00	2,040.00	510.00	77.00	18.80
TD20G LGP	Straight	EROPS	225.0	11,060.00	3,095.00	775.00	115.00	26.20
TD20G LGP	Straight	ROPS	225.0	10,750.00	3,010.00	755.00	115.00	25.70

# **APPENDIX 9**

(Davis-Bacon Wages for Tooele County)

General Decision Number UT930020

Superseded General Decision No. UT910020

State: Utah

Construction Type:  
Heavy

County(ies):  
TOOELE

HEAVY CONSTRUCTION PROJECTS (Including Water and Sewer Lines  
Construction and Wastewater Treatment Plants)

Modification Number	Publication Date
0	02/19/1993
1	02/19/1993
2	09/10/1993
3	10/08/1993

COUNTY(ies):  
TOOELE

BOIL0182A 07/01/1993		
	Rates	Fringes
BOILERMAKERS	18.48	7.79
-----		
* ELEC0354A 06/01/1993		
	Rates	Fringes
ELECTRICIANS	17.40	3.10+3.8%
-----		
SUUT2004A 03/23/1992		
	Rates	Fringes
CARPENTERS	14.44	2.65
CEMENT MASONS	15.07	2.35
IRONWORKERS:		
Structural & Ornamental	16.65	3.46
Reinforcing	16.65	3.49
Fence Erector	16.65	3.58
LABORERS:		
General	13.82	2.65
Concrete	16.56	1.65
Concrete saw	17.45	.49
PAINTERS:		
Spray	14.05	1.62
Sandblaster	14.05	1.62
PLUMBERS	17.46	3.26
PIPEFITTERS	16.74	3.26
POWER EQUIPMENT OPERATORS:		
Asphalt screed	18.05	7.08
Backhoe	18.71	6.76
Bulldozer, all sizes	19.97	5.78
Compactor	20.47	5.39
Grader	19.88	5.74
Loader, up to 6 CY	18.45	5.82
Loader, over 6 CY	21.60	5.39
Piledriver	20.05	7.08
Roller	18.82	6.47
Steel Erector	23.09	7.08
TRUCK DRIVERS:		
Dump Trucks - Water level capacity (bottom, end and side),(Including dumpster truck, turnawagon, turnarockers and dumpcrete):		
Up to 14 CY	16.98	5.51
14 CU YDS and less than 35 CU YDS	18.27	5.48
Water, Fuel and Oil Trucks All Sizes	14.69	5.68

# **APPENDIX 10**

(Government Perdiem Rates)





U.S. General Services Administration

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Home &gt; Policy &gt; Travel &gt; Privately Owned Vehicle Reimb Rates



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Federal Travel Regulation

GSA Travel Advisories

Interagency Travel  
Management CommitteePrivately Owned Vehicle  
Reimb RatesTravel Mgmt Policy  
Notification Mail

Library

## Travel

### Privately Owned Vehicle Reimbursement Rates (POV)

The following lists the 2003 Privately Owned Vehicle (POV) reimbursement rates for automobiles, motorcycles, and airplanes.

The Federal Travel Regulation [Amendment 112](#), was published in the Federal Register on January 6, 2003. This amendment has decreased the mileage reimbursement rates for use of Privately Owned Vehicles (POV) on official government travel.

The rates for the use of these modes of transportation, effective January 1, 2003, are as follows:

#### Privately Owned Vehicle Reimbursement Rates:

- Airplane ..... 95.5 cents per mile
- Automobile Rates:
  - 36.0 cents per mile (if no Government Owned Vehicle available)
  - 28.5 cents per mile (if Government Owned Vehicle available)
  - 10.5 cents per mile (if committed to use Government Owned Vehicle)
- Motorcycle POV Rate ..... 27.5 cents per mile

#### Past year's automobile rates are as follows:

- Effective January 1, 1995 ..... \$0.30
- Effective June 7, 1996 ..... \$0.31
- Effective September 8, 1998 ... \$0.325
- Effective April 1, 1999 ..... \$0.31
- Effective January 14, 2000 ..... \$0.325
- Effective January 22, 2001 ..... \$0.345
- Effective January 21, 2002 ..... \$0.365

E-TOOL

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EVENT

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[2004](#)

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Per Diem rates for UTAH						Standard CONUS Property List	
Effective October 1, 2002							
Per diem locality (Cities not listed or located in listed counties have a Standard CONUS rate of \$55 Lodging & \$31 M&IE for FY 2004; for all other years the rate is \$55 Lodging & \$30 M&IE)		Maximum lodging (excludes taxes) (a)	+	M & IE rate . (b)	=	Maximum per diem rate (4) (c)	Property Listing Update
Key city (1)	County and/or other defined location (2, 3)						Properties at Per diem
Bullfrog	Garfield	73		34		107	<u>Prop. List</u>
Cedar City	Iron	59		38		97	<u>Prop. List</u>
Moab (Mar 15 - Oct 31) (Nov 1 - Mar 14)	Grand	90 55		38 38		128 93	<u>Prop. List</u> <u>Prop. List</u>
Ogden/Layton/Davis County	Weber and Davis	69		38		107	<u>Prop. List</u>
Park City (Apr 1 - Dec 14) (Dec 15 - Mar 31)	Summit	79 169		46 46		125 215	<u>Prop. List</u> <u>Prop. List</u>
Provo (Mar 1 - Oct 31) (Nov 1 - Feb 28)	Utah	69 60		42 42		111 102	<u>Prop. List</u> <u>Prop. List</u>
Salt Lake City	Salt Lake and Dugway Proving Ground and	75		38		113	<u>Prop. List</u>

	Tooele Army Depot					
Salt Lake City (Effective September 3, 2003)	Salt Lake and Dugway Proving Grounds and Tooele Army Depot	80		38		118
						<u>Prop. List</u>

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# **APPENDIX 11**

(Means Estimating Guide for OH&P)



# 010 | Overhead & Miscellaneous Data

## 010 000 | Overhead

			CREW	DAILY OUTPUT	LABOR-HOURS	UNIT	1996 BARE COSTS				TOTAL INCL O&P
							MAT.	LABOR	EQUIP.	TOTAL	
040	1700	Waterproofing, brush or hand caulking				Payroll		9.15%			04
	1800	Wrecking						44.76%			
	2000	Range of 35 trades in 50 states, excl. wrecking, minimum						2.30%			
	2100	Average						20.20%			
	2200	Maximum						172.70%			
042	0010	JOB CONDITIONS Modifications to total									04
	0020	project cost summaries									
	0100	Economic conditions, favorable, deduct				Project					
	0200	Unfavorable, add								2%	
	0500	General Contractor management, experienced, deduct								5%	
	0600	Inexperienced, add								2%	
	0700	Labor availability, surplus, deduct								10%	
	0800	Shortage, add								1%	
	1100	Subcontractor availability, surplus, deduct								10%	
	1200	Shortage, add								5%	
048	0010	MAIN OFFICE EXPENSE Average for General Contractors								12%	048
	0020	As a percentage of their annual volume									
	0030	Annual volume to \$50,000, minimum				% Vol.				20%	
	0040	Maximum								30%	
	0050	Annual volume under 1 million dollars								13.60%	
	0060	To \$100,000, minimum								17%	
	0070	Maximum								22%	
	0080	To \$250,000, minimum								16%	
	0090	Maximum								19%	
	0110	To \$500,000, minimum								14%	
	0120	Maximum								8%	
	0130	To \$1,000,000, minimum								10%	
	0140	Maximum								6.80%	
	0150	Up to 4.0 million dollars								5.60%	
	0200	Up to 7.0 million dollars								5.10%	
	0250	Up to 10 million dollars								3.90%	
	0300	Over 10 million dollars									
052	0010	MARK-UP For General Contractors for change									052
	0100	of scope of job as bid									
	0200	Extra work, by subcontractors, add				%				10%	
	0250	By General Contractor, add								15%	
	0400	Omitted work, by subcontractors, deduct								5%	
	0450	By General Contractor, deduct								7.50%	
	0600	Overtime work, by subcontractors, add								15%	
	0650	By General Contractor, add								10%	
	1150	Overhead markup, see division 010-060									
062	0010	OVERHEAD & PROFIT Allowance to add to items in this									062
	0020	book that do not include Subs O&P, average				%				25%	
	0100	Allowance to add to items in this book that									
	0110	do include Subs O&P, minimum				%				5%	
	0150	Average								10%	
	0200	Maximum								15%	
	0300	Typical, by size of project, under \$100,000								30%	
	0350	\$500,000 project								25%	
	0400	\$2,000,000 project								20%	
	0450	Over \$10,000,000 project								15%	
064	0010	OVERTIME For early completion of projects or where									064
	0020	labor shortages exist, add to usual labor, up to				Costs	100%				

# **APPENDIX 12**

(Means Estimating Guide for Contingencies)



RSMeans®

2000



# 01100 | Summary

## 01107 | Professional Consultant

		CREW	DAILY OUTPUT	LABOR- HOURS	UNIT	2000 BARE COSTS				TOTAL INCL O&P	
						MAT.	LABOR	EQUIP.	TOTAL		
1300	4 person crew	A-8	1	32	Day		915		915	1,400	700
1500	Aerial surveying, including ground control, minimum fee, 10 acres				Total					5,500	
1	100 acres				↓					9,100	
1	From existing photography, deduct				↓					1,340	
1600	2' contours, 10 acres				Acre					440	
1650	20 acres				↓					300	
1800	50 acres				↓					90	
1850	100 acres				↓					80	
2000	1000 acres				↓					17.01	
2050	10,000 acres				↓					11.01	
2150	For 1' contours and				Acre					40%	
2160	dense urban areas, add to above				↓						
3000	Inertial guidance system for				Ea.					4,000	
3010	locating coordinates, rent per day										

GENERAL REQUIREMENTS

## 01200 | Price & Payment Procedures

### 01250 | Contract Modification Procedures

		CREW	DAILY OUTPUT	LABOR- HOURS	UNIT	2000 BARE COSTS				TOTAL INCL O&P	
						MAT.	LABOR	EQUIP.	TOTAL		
0010	CONTINGENCIES for estimate at conceptual stage				Project					20%	200
0050	Schematic stage				↓					15%	
0100	Preliminary working drawing stage (Design Dev.)				↓					10%	
0150	Final working drawing stage				↓					3%	
00	EWS For building construction, see How To Use This Book										300
0010	JOB CONDITIONS Modifications to total										500
0020	project cost summaries				Project					2%	
0100	Economic conditions, favorable, deduct				↓					5%	
0200	Unfavorable, add				↓					2%	
0300	Hoisting conditions, favorable, deduct				↓					5%	
0400	Unfavorable, add				↓					2%	
0500	General Contractor management, experienced, deduct				↓					10%	
0600	Inexperienced, add				↓					1%	
0700	Labor availability, surplus, deduct				↓					10%	
0800	Shortage, add				↓					1%	
0900	Material storage area, available, deduct				↓					2%	
1000	Not available, add				↓					5%	
1100	Subcontractor availability, surplus, deduct				↓					12%	
1200	Shortage, add				↓					2%	
1300	Work space, available, deduct				↓					5%	
1400	Not available, add				↓						
0010	OVERTIME For early completion of projects or where				Costs		100%				600
0020	labor shortages exist, add to usual labor, up to										

R01100  
-110

### 01255 | Cost Indexes

0012	CONSTRUCTION COST INDEX (Appendix) for 67 major U.S. and				%					79.40%	200
0021	Canadian cities, total cost, min. (Rock Springs, WY)				↓					100%	
0050	Average				↓					126.20%	
0101	Maximum (Anchorage, AK)				↓						
00	HISTORICAL COST INDEXES (Reference) Back to 1950										400



# **APPENDIX 13**

(BLM Administrative Costs Guidance)

The indirect cost amounts collected by BLM will continue to be applied to a Bureauwide credit account and allocated on a Bureauwide basis as part of the 4830 (General Administration) cost targets to provide for the cost of supporting reimbursable, cost recoverable, and contributed fund projects.

### ***Exceptions to the Indirect Administrative Cost Rate for Contributed Fund projects***

Projects in the Contributions Account (71XX) that the cognizant BLM State Director determines are of primary benefit to the general public and further Bureau management objectives may be exempted from application of any indirect administrative cost charges or may be given reduced indirect administrative cost rates. The State Director is responsible for making the determination of exemption and calculating the new rate. If two or more States are involved in the contributed funds project, the cognizant State Directors are responsible for assuring that similar rates are applied. For 71XX projects determined to be exempt or having a reduced rate, the cognizant State Director is responsible for submitting the waiver form (BLM Form 1681-3a) to the BLM Service Center Division of Finance.

The BLM California State Director is authorized to set the indirect administrative rate for the California Off-Highway Vehicle (OHV) contribution (7123) projects. The rates should reflect the actual support required for each project.

### ***Indirect Costs Associated with Fire Protection Reimbursements***

Fire protection and presuppression reimbursable work performed under subactivity 1590 (Fire Reimbursements) for National Agreement Cooperating agencies and presuppression work for State agencies covered by formal agreements are exempt from the indirect administrative cost rate. This category of exempt activities includes: dispatch and logistical support services; prevention and detection services; crews and personnel, telecommunication support services; smokejumper operations, fire suppression training and support and training materials necessary for fire preparedness. Participating agencies which provide similar and like services in presuppression activities are the following: USDA-Forest Service, NPS, BIA, and FWS, and State Forestry agencies engaged in wildfire suppression. The indirect administrative charge also does not apply to 1590 interagency core funding for BIFC under Interagency Agreement No. 18.

Functions such as management type work, fire planning, indirect office space charges and prescribed fire activities are *not* exempt from the indirect administrative charges. All project costs (i.e., personnel time, leave surcharge, travel, materials, equipment, facilities, and utility charges) for subactivity 1590 fire presuppression work, will continue to be recovered via the reimbursable process, and recorded on BLM Form 1681-3, Reimbursable Work Project Authorization, a copy of which should be sent to the BLM Service Center Division of Finance (SC-615).

### ***Review of the applicability of the full rate to certain reimbursable work***

The application of the full indirect administrative cost rate to certain types of reimbursable projects, such as tying other Federal agencies into existing third-party contracts, has been identified in some cases as not equitable. The concern is that a large contract or a pass-thru project does not necessarily cost the BLM as much in administrative support as projects with

a large proportion of direct labor intensive work, yet the same rate is charged. Based on requests from the cognizant State Director, the Headquarters Office will consider applying lower rates, such as 10 percent, for such projects. Such requests are to be sent to the Headquarters Office Division of Budget (WO-880) for review and approval.

***Waivers and Exceptions for other special projects***

There may be some rare instances where a reduction or waiver of the indirect administrative cost rate for a certain Reimbursable (49XX, 29XX, 69XX) project may facilitate the BLM's work. If the cognizant State Director believes that there is a project warranting such an exception, a waiver/reduction of the indirect administrative cost rate can be requested from the Headquarters Office Division of Budget (WO-880) by the State Director in writing. Requests will be reviewed and, if justified, approved for a waiver. However, the BLM incurs administrative costs with all projects. These indirect support costs must be funded either through the application of the indirect rate or by a subsidy from appropriated General Administration (4830) or other program dollars.

In no case will waivers or reductions in the indirect administrative cost rate for cost recoverable projects under the Service Charges, Deposits and Forfeitures account (5XXX) for otherwise non-exempt programs be considered. Since these projects are being accomplished for the benefit of non-governmental agencies or private entities, the BLM must recover the full indirect administrative cost rate under the law.

Any questions regarding this instruction memorandum may be referred to Harold Grayson, Division of Budget (WO-880), on (202) 208-4168.

Signed

Roger Hildebeidel

Acting Assistant Director, Management Services

Authenticated

Georgette A. Fogle

Directives (WO 855)

NOTE - FOR YOUR INFORMATION

TO: UT950 Attn: Linda MacDonald

FROM: SC610 Kay Benson

SUBJECT: General Administrative Expense (Indirect Cost)

The indirect cost moved from Programs 5310, 5320, 9110 and 9120 for August 1995, to bring your availability back into line will reflect in your September reports. The following will tell you how much indirect (18%) for Programs 5310 and 5320, and (5%) for Programs 9110 and 9120 was taken on collections for August:

5320	UT040	\$	148.16
	UT050	\$	1.08
	UT060	\$	97.78
	UT080	\$	44.71

9120	UT020	\$	1.50
	UT040	\$	41.84
	UT050	\$	8.60
	UT060	\$	27.13
	UT080	\$	26.09

# **APPENDIX 14**

(Western Mine Cost Index)

**TABLE 5. Mining Cost Service (MCS) Indexes - U.S.**

Year	Surface Mine		Underground Mine		Mill	
	Capital Cost Index	Operating Cost Index	Capital Cost Index	Operating Cost Index	Capital Cost Index	Operating Cost Index
1988	84.1	85.5	83.7	86.0	86.1	89.3
1989	88.8	90.4	88.3	90.0	90.3	93.2
1990	92.5	95.7	92.0	92.9	93.2	95.3
1991	94.5	97.7	95.2	96.5	95.2	98.0
1992	96.2	98.7	96.7	97.8	96.3	98.2
1993	98.2	99.0	98.4	98.4	97.9	98.9
1994	100.0	100.0	100.0	100.0	100.0	100.0
1995	102.7	102.4	102.8	102.9	103.1	103.9
1996	105.9	105.7	105.3	104.8	105.6	104.4
1997	108.2	107.0	108.1	107.0	107.8	105.1
1998	110.2	106.7	110.7	110.0	109.2	104.6
1999	112.5	108.7	112.9	110.5	110.6	103.8
2000	115.9	113.5	115.3	111.5	114.7	107.9
2001	116.9	114.5	118.0	114.8	116.1	110.2
2002 Jan.	117.0	111.7	121.0	114.7	114.2	106.5
2002 Feb.	117.3	111.8	122.2	114.3	114.3	106.4
2002 Mar.	118.9	113.4	122.4	114.6	114.7	107.3
2002 Apr.	119.4	114.4	122.7	114.7	115.5	108.3
2002 May	119.3	114.4	122.8	115.1	115.8	109.4
2002 June	119.3	114.1	123.0	115.6	116.9	111.1
2002 July	119.8	115.2	123.4	116.3	117.6	112.3
2002 Aug.	120.1	115.7	123.5	116.3	117.9	112.6
2002 Sept.	121.0	117.7	123.9	117.0	118.7	113.8
2002 Oct.	121.4	118.8	123.8	116.6	118.4	112.8
2002 Nov.	120.7	116.9	123.7	116.4	118.1	112.7
2002 Dec.	121.0	117.1	123.9	116.4	118.9	112.3
2003 Jan.	121.9	119.6	124.2	117.7	119.0	114.1
2003 Feb.	123.5	124.0	126.8	118.7	120.1	116.5
2003 Mar.	124.1 (P)	125.2 (P)	124.8 (P)	119.4 (P)	120.6 (P)	117.5 (P)
2003 Apr.	122.9 (P)	121.0 (P)	125.0 (P)	118.9 (P)	120.5 (P)	116.2 (P)
2003 May	122.0 (P)	118.4 (P)	124.8 (P)	118.2 (P)	120.2 (P)	115.2 (P)
2003 June	122.3 (P)	119.2 (P)	125.0 (P)	118.8 (P)	120.5 (P)	116.1 (P)

P=Preliminary

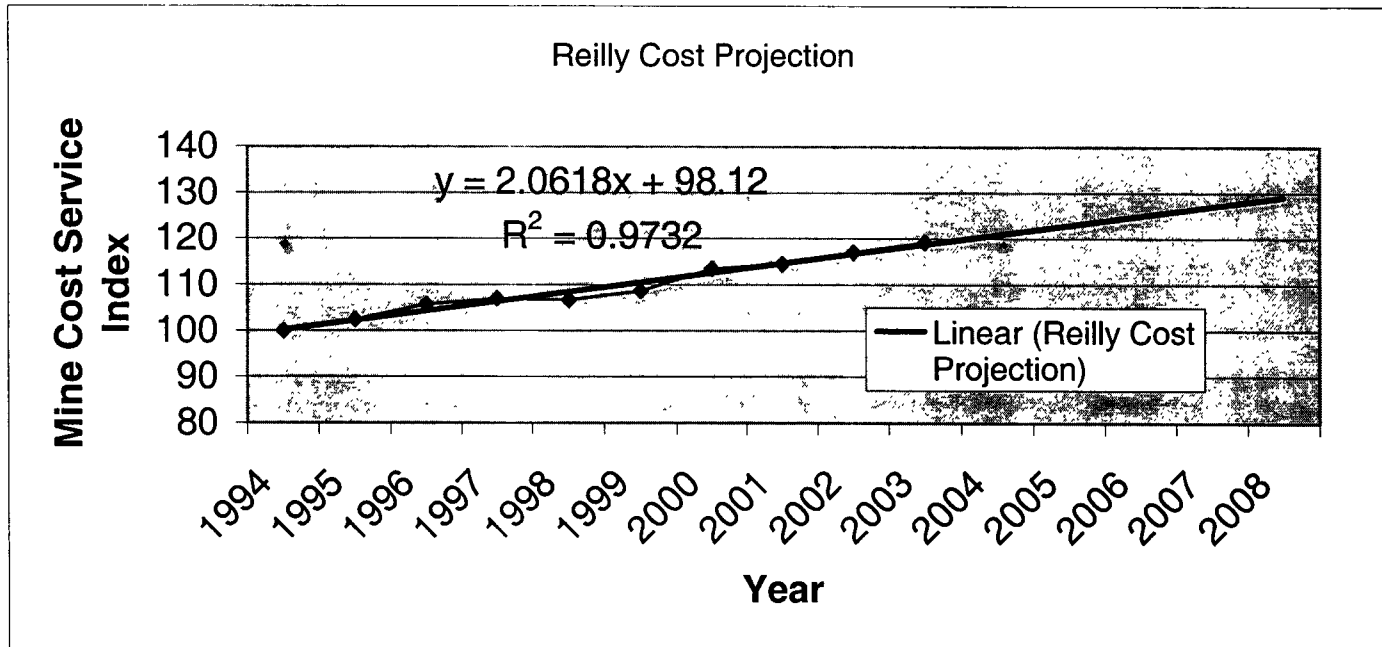
The U.S. MCS indexes are composite indexes representing the cost of developing and operating a typical mining and milling operation in the United States. Separate indexes are listed for surface mine capital costs, surface mine operating costs, underground mine capital costs, underground mine operating costs, mill capital costs and mill operating costs. Composite proportions are determined from base model estimates with cost distributions as listed below. The surface mine base model is a typical truck/hydraulic excavator operation mining 10,000 short tons ore and 20,000 short tons waste per day. The underground mine base model is a 10,000 short tons per day room and pillar operation using conventional drilling and blasting, with shaft access and LHD and truck haulage. The mill model is a 10,000 short ton per day single product flotation mill.

Surface Mine				Underground Mine				Mill			
Capital Costs		Operating Costs		Capital Costs		Operating Costs		Capital Costs		Operating Costs	
Component	Proportion (%)	Component	Proportion (%)	Component	Proportion (%)	Component	Proportion (%)	Component	Proportion (%)	Component	Proportion (%)
Equipment		Fuel	8.48	Equipment		Fuel	1.06	Equipment		Fuel	2.18
Excav./Loaders	10.15	Lubricants	2.68	Pumps	1.09	Lubricants	1.63	Crushers	1.06	Lubricants	3.67
Trucks	20.31	Electricity	0.47	Loaders	0.79	Electricity	14.07	Grinding mills	16.35	Electricity	33.45
Drills	4.78	Parts		Trucks	12.05	Parts		Concentration Eq.	4.32	Parts	
Dozers	8.00	Excavators	1.54	Drills	25.18	Pumps	0.32	Tailings pond	25.51	Crsh/grnd mills	4.15
Roads	2.35	Loaders	1.42	Hoists	2.07	Loaders	0.04	Buildings & Eq. Installation		Conc. Eq.	1.04
Preproduction Strip	26.05	Trucks	5.94	Fans	1.21	Trucks	0.97	Timber	0.21	Reagents	12.93
Buildings		Drills	1.40	LHD's	7.68	Drills	1.92	Concrete	1.98	Grinding Media	15.83
Timber	0.04	Dozers	2.34	Preprod. Devel.	20.06	Hoists	1.49	Steel	7.79	Mill Labor	26.75
Concrete	0.30	Tires	6.47	Buildings		Fans	0.80	Constr. Materials	2.57		100.00
Steel	0.74	Explosives	17.82	Timber	0.04	LHD's	0.16	Purchased Eq.	5.35		
Constr. Materials	2.15	Drill Bits/Steel	2.18	Concrete	0.30	Tires	0.53	Constr. Labor	28.75		
Equipment	2.33	Mine Labor	49.26	Steel	0.75	Explosives	13.24	Construction Equip. Operation			
Constr. Labor	16.13		100.00	Constr. Materials	2.20	Drill Bits/Steel	2.04	Parts	0.31		
Construction Equip. Operation				Purchased Eq.	2.39	Rockbolts	1.45	Fuel	0.31		
Parts	0.06			Constr. Labor	15.89	Water Pipe	0.71	Lube	0.10		
Fuel	0.06			Construction Equip. Op.		Air Pipe	1.34	Electrical System	0.60		
Lube	0.02			Parts	0.06	Vent Tubing	3.43	Working Capital	4.79		
Electrical System	0.22			Fuel	0.06	Electrical Cable	0.42		100.00		
Working Capital	6.31			Lube	0.02	Mine Labor	54.38				
	100.00			Working Capital	8.16		100.00				
					100.00						

Number	Year	MCS Index	Projected Index
1	1994	100	100.2
2	1995	102.4	102.2
3	1996	105.7	104.3
4	1997	107	106.4
5	1998	106.7	108.4
6	1999	108.7	110.5
7	2000	113.4	112.6
8	2001	114.5	114.6
9	2002	117	116.7
10	2003	119.2	118.7
11	2004		120.8
12	2005		122.9
13	2006		124.9
14	2007		127.0
15	2008		129.0

### Inflation Factor to 2008

$$\frac{129.0}{119.2} = 1.08$$





tration and management of the use of such minerals shall be accomplished under the regulations of Subchapter C of this title. Such mineral estates include, but are not limited to, those that have been or will be reserved under the authorities of the Recreation and Public Purposes Act, as amended (43 U.S.C. 869 *et seq.*), the Small Tract Act of June 1, 1938, as amended (43 U.S.C. 682(b)) and the Federal Land Policy and Management Act of 1969 (43 U.S.C. 1701 *et seq.*).

### Subpart 3501—Descriptions and Acreage

#### § 3501.1 Land descriptions.

##### § 3501.1-1 Public domain.

Each application shall contain a complete and accurate description of the lands for which the lease or permit is desired. The lands applied for shall be in reasonably compact form.

(a) If the lands have been surveyed under the public land rectangular system, each application shall describe the lands by legal subdivision, section, township and range. Generally, a quarter-quarter section or a lot is the smallest legal subdivision for which an application may be made.

(b) When protracted surveys have been approved and the effective date thereof published in the FEDERAL REGISTER, all applications for lands shown on such approved protracted surveys shall describe the lands in the same manner as provided in paragraph (a) of this section for officially surveyed lands.

(c) If the lands have neither been surveyed on the ground nor shown on the records as protracted surveys, each application shall describe the lands by metes and bounds, giving courses and distances between the successive angle points on the boundary of the tract, in cardinal directions except where the boundaries of the lands are in irregular form, and connected by courses and distances to an official corner of the public land surveys.

(d)(1) Prior to the issuance of a lease, all unsurveyed lands in the lease shall be surveyed.

(2) On a noncompetitive lease, the survey for unsurveyed lands shall be at the expense of the applicant.

(3) On a competitive lease, the survey of unsurveyed lands shall be at the expense of the United States.

#### § 3501.1-2 Acquired lands.

(a)(1) If the lands have been surveyed under the rectangular system of public land surveys, the description shall conform to that system and the lands shall be described by legal subdivision, section, township, and range. Generally, a quarter-quarter section or a lot is the smallest legal subdivision for which an application may be made.

(2) Where the description cannot conform to the public land surveys, any boundaries which do not so conform shall be described by metes and bounds, giving courses and distances between the successive angle points with appropriate ties to the nearest existing official survey corner. If not surveyed but within the area of the public land surveys, the lands shall be described by metes and bounds, giving courses and distances between the successive angle points on the boundary of the tract, and connected to a reasonably nearby official survey corner by courses and distances. Each application shall be accompanied by a map upon which the desired lands are clearly marked showing their location with respect to the administrative unit or project of which they are a part.

(b) If the lands have not been surveyed under the rectangular system of public land surveys, and the tract is not within the area of the public land surveys, it shall be described as in the deed or other document by which the United States acquired title to the lands or minerals. If the desired lands constitute less than the entire tract acquired by the United States, they shall be described by courses and distances between successive angle points on the boundary of the tract, tying by course and distance into the description in the deed or other document by which the United States acquired title to the lands. In addition, if the description in the deed or other document by which the United States acquired title to the lands does not in-

clude the courses and distances between the successive angle points on the boundary of the desired tract, the description in the application shall be expanded to include such courses and distances. Each application shall be accompanied by a map upon which the desired lands are clearly marked showing their location with respect to the administrative unit or project of which they are a part.

(c) If an acquisition tract number has been assigned by the acquiring agency to the identical tract desired, a description by such tract number shall be accepted in lieu of the description required in paragraphs (a)(2) and (b) of this section. However, such application shall be accompanied by the map required by paragraphs (a)(2) and (b) of this section.

[51 FR 15213, Apr. 22, 1986; 51 FR 25204, July 11, 1986]

#### § 3501.1-3 Accreted lands.

Where an application includes any accreted lands that are not described in the deed to the United States, such accreted lands shall be described by metes and bounds, giving courses and distances between the successive angle points on the boundary of the tract, and connected by courses and distances to an angle point on the perimeter of the acquired tract to which the accretions belong.

#### § 3501.2 Computing acreage holdings.

(a) In computing acreage holdings or control, the accountable acreage of a party owning any interest, either directly or indirectly, shall be such party's proportionate part of the total lease and permit acreage. Likewise, the accountable acreage of a party owning an interest in a corporation or association shall be such party's proportionate part of the corporation's or association's accountable acreage, except that no party shall be charged with its pro rata share of any acreage holdings of any association or corporation, unless it is the beneficial owner of more than 10 percent of the stock or other instruments of ownership or control of such association or corporation.

(b) The amount of acquired lands acreage for leasable minerals that may

be held under lease or permit may not be in excess of the amount of public domain acreage for the same minerals permitted to be held under the Act. Public domain lease holdings shall not be charged against acquired lands lease holdings and vice versa; such respective holdings shall not be interchangeable.

(c) Where the United States owns only a fractional interest in the mineral resources of the lands involved, only that part of the total acreage involved in the lease which is proportionate to the ownership by the United States of the mineral resources therein shall be charged as acreage holdings. The acreage embraced in a future interest lease is not to be charged as acreage holdings until the lease for the future interest takes effect.

### Subpart 3502—Qualification Requirements

#### § 3502.1 Who may hold leases and permits.

(a) Leases and permits may be held only by citizens of the United States, associations (including partnerships and trusts) of such citizens, corporations organized under the laws of the United States or of any State or territory thereof. Citizens of a foreign country may only hold interest in leases or permits through stock ownership, stock holding or stock control.

(b) Citizens of a foreign country may only hold interests in leases and permits for leasable minerals if the laws, customs or regulations of their country do not deny similar or like privileges to citizens or corporations of the United States. A list of those countries denying similar or like privileges is available from any Bureau office.

(c) A mineral lease or permit shall not be issued to a minor. Leases or permits may be issued to a legal guardian or trustee of a minor.

(d) Except for an assignment or sublease under section 3506 of this title, a lease for leasable minerals shall be issued only to an entity if it is in compliance with section 2(a)(2)(A) of the act (compliance is determined for Federal coal leases in accordance with § 3472.1-2(e) of this title). A lease

any map submitted by an operator/lessee is incorrect, the authorized officer may cause a survey to be made, and if the survey shows the map submitted by the operator/lessee to be substantially incorrect in whole or in part, the cost of making the survey and preparing the map shall be charged to and promptly paid by the operator/lessee.

#### **Subpart 3593—Bore Holes and Samples**

##### **§ 3593.1 Core or test hole cores, samples, cuttings.**

(a) The operator/lessee shall submit promptly to the authorized officer a signed copy of records of all core or test holes made on the lands covered by the lease, license or permit. The records shall be in a form that will show the position and direction of the holes to be located on a map. The records shall include a log of all strata penetrated and conditions encountered, such as water, gas or unusual conditions. Copies of analysis of all samples shall be transmitted to the authorized officer as soon as obtained or as requested by the authorized officer. The operator/lessee shall furnish the authorized officer a detailed lithologic log of each drill hole and all other in-hole surveys or other logs produced. The core from test holes shall be retained by the operator/lessee for 1 year or such other period as may be directed by the authorized officer, and shall be available for inspection by the authorized officer. The authorized officer may cut such cores and receive samples as appropriate. Upon the request of the authorized officer, the operator/lessee shall furnish samples of strata, drill cuttings and mill products.

(b) Surface drill holes for development or holes for prospecting shall be abandoned to the satisfaction of the authorized officer by cementing and/or casing or by other methods approved in advance by the authorized officer and in a manner to protect the surface and not endanger any present or future underground operation or any deposit of oil, gas, other mineral substances or aquifer.

ment holes shall not be required unless specifically requested by the authorized officer. Drill holes may be converted to surveillance wells for the purpose of determining the effect of subsequent operations upon the quantity, quality of pressure of ground water or mine gases. Such conversion may be required by the authorized officer or requested by the operator/lessee and approved by the authorized officer. Prior to the termination of the lease, license or permit term, all surveillance wells shall be reclaimed unless the surface owner assumes responsibility for reclamation of such surveillance wells. The transfer of liability for reclamation shall be approved in writing by the authorized officer.

(d) When drilling on lands with potential for encountering high pressure oil, gas or geothermal formations, drilling equipment shall be equipped with blowout control devices acceptable to the authorized officer.

#### **Subpart 3594—Mining Methods**

##### **§ 3594.1 Ultimate maximum recovery.**

(a) Mining operations shall be conducted in a manner to yield the ultimate maximum recovery of the mineral deposits, consistent with the protection and use of other natural resources and the protection and preservation of the environment—land, water and air. All shafts, main exits and passageways, as well as overlying beds or mineral deposits that at a future date may be of economic importance, shall be protected by adequate pillars in the deposit being worked or by such other means as approved by the authorized officer.

(b) New geologic information obtained during mining regarding any mineral deposits on the lease shall be fully recorded and a copy of the record furnished to the authorized officer, if requested.

##### **§ 3594.2 Support pillars.**

Sufficient pillars shall be left during first mining to ensure the ultimate maximum recovery of mineral deposits prior to abandonment. All boundary

pillars shall be left in place unless otherwise specified in writing by the authorized officer. Boundary and other main pillars shall be mined only with the written consent or by order of the authorized officer.

##### **§ 3594.3 Boundary pillars and isolated blocks.**

(a) If the ore on adjacent lands subject to the regulations in this part has been worked out beyond any boundary pillar, if the water level beyond the pillar is below the operator's/lessee's adjacent operations, and if no other hazards exist, the operator/lessee shall, on the written order of the authorized officer, mine out and remove all available ore in such boundary pillar, both in the lands covered by the lease and in the adjoining premises, when the authorized officer determines that such ore can be mined without undue hardship to the operator/lessee.

(b) If the mining rights in adjoining premises are privately owned or controlled, an agreement may be made with the owners of such interests for the extraction of the ore in the boundary pillars.

(c) Narrow strips of ore between leased lands and the outcrop on other lands subject to the regulations in this part and small blocks of ore adjacent to leased lands that would otherwise be isolated or lost may be mined under the provisions of paragraphs (a) and (b) of this section.

##### **§ 3594.4 Development on leased lands through adjoining mines as part of a mining unit.**

An operator/lessee may mine a leased tract from an adjoining underground mine on lands privately owned or controlled or from adjacent leased lands, under the following conditions:

(a) The only connections between the mine on lands privately owned or controlled and the mine on leased lands shall be the main haulageways, the ventilationways and the escapeways. Substantial concrete frames and fireproof doors that can be closed in an emergency and opened from either side shall be installed in each such connection. Other connections through the boundary pillars shall not

be made until both mines are about to be exhausted and abandoned. The authorized officer may waive any of the requirements of this paragraph when it is determined such waiver will not conflict with the regulations in 30 CFR part 57 and will promote maximum recovery of the ore.

(b) Free access for inspection of said connecting mine on lands privately owned or controlled shall be given at any reasonable time to the authorized officer.

(c) If an operator/lessee is operating on a lease through a mine on lands privately owned or controlled does not maintain the mine access in accordance with the safety regulations, operations on the leased lands may be stopped by order of the authorized officer.

##### **§ 3594.5 Minerals soluble in water; brines; minerals taken in solution.**

(a) In mining or prospecting deposits of sodium, potassium or other minerals soluble in water, all wells, shafts, prospecting holes and other openings shall be adequately protected with cement or other suitable materials against the coursing or entrance of water. The operator/lessee shall, when ordered by the authorized officer, backfill with rock or other suitable material to protect the roof from breakage when there is a danger of the entrance of water.

(b) On leased, license or permit lands containing brines, due precaution shall be exercised to prevent the deposit from becoming diluted or contaminated by the mixture of water or valueless solution.

(c) Where minerals are taken from the earth in solution, such extraction shall not be within 500 feet of the boundary line of lands contained in the approved mine plan without the written permission of the authorized officer.

(d) Any agreement necessary for allocation of brine production shall be made a part of the mine plan.

thorized officer, and the operations on leased lands shall be stopped.

[37 FR 11041, June 1, 1972. Redesignated at 48 FR 36588, Aug. 12, 1983, and amended at 48 FR 44795, Sept. 30, 1983. Redesignated at 51 FR 15212, Apr. 22, 1986]

§ 3594.5 Minerals soluble in water; brines; minerals taken in solution.

In mining or prospecting deposits of potassium or other minerals soluble in water, all wells, shafts, prospect holes, and other openings shall be adequately protected with neat cement or other suitable materials against the coursing or entrance of water; and the operator shall, on orders of the authorized officer, backfill with rock or other suitable material to protect the roof from breakage when there is a danger of the entrance of water. On leased or permit lands containing brines, due precaution shall be exercised to prevent the deposits becoming diluted or contaminated by the mixture of water or valueless solution. Where minerals are taken from the earth in solution, such extraction shall not be within 500 feet of the boundary line of the leased lands without the written permission of the authorized officer.

[37 FR 11041, June 1, 1972. Redesignated at 48 FR 36588, Aug. 12, 1983. Redesignated at 51 FR 15212, Apr. 22, 1986]

#### Subpart 3595—Protection Against Mining Hazards

§ 3595.1 Surface openings.

(a) The operator shall substantially fill in, fence, protect or close all surface openings, subsidence holes, surface excavations or workings which are a hazard to people or animals. Such protective measures shall be maintained in a secure condition during the term of the permit or lease. Before abandonment of operations all openings, including water discharge points, shall be closed to the satisfaction of the authorized officer.

(b) Reclamation or protection of surface areas no longer needed for operations should commence without delay. The authorized officer shall designate such areas where restoration or protective measures, or both, must be taken.

[37 FR 11041, June 1, 1972. Redesignated at 48 FR 36588, Aug. 12, 1983. Redesignated at 51 FR 15212, Apr. 22, 1986]

§ 3595.2 Abandonment of underground workings.

No underground workings or part thereof shall be permanently abandoned and rendered inaccessible without the advance and written approval of the authorized officer.

[37 FR 11041, June 1, 1972. Redesignated at 48 FR 36588, Aug. 12, 1983. Redesignated at 51 FR 15212, Apr. 22, 1986]

#### Subpart 3596—Milling; Waste from Mining or Milling

§ 3596.1 Milling.

It shall be the duty of the operator to conduct milling operations pursuant to the terms of the lease, the approved mining plan, and the regulations in this part and to use due diligence in the reduction, concentration, or separation of mineral substances by mechanical or chemical processes, by distillation, by evaporation, or other means so that the percentage of salts, concentrates, oil, or other mineral substances recovered shall be in accordance with approved practices.

[37 FR 11041, June 1, 1972. Redesignated at 48 FR 36588, Aug. 12, 1983. Redesignated at 51 FR 15212, Apr. 22, 1986]

§ 3596.2 Disposal of waste.

The operator shall dispose of all wastes resulting from the mining, reduction, concentration, or separation of mineral substances in accordance with the terms of the lease, approved mining plan, the regulations in this part, and the directions of the authorized officer.

[37 FR 11041, June 1, 1972. Redesignated at 48 FR 36588, Aug. 12, 1983. Redesignated at 51 FR 15212, Apr. 22, 1986]

#### Subpart 3597—Production Records and Audit

§ 3597.1 Books of account.

Operators shall maintain books in which will be kept a correct account of all ore and rock mined, of all ore put through the mill, of all mineral prod-

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d to the satisfaction of the mining supervisor and in a manner endanger any present or future underground operation or any deposit of or other mineral substances.

#### WELFARE AND SAFETY

Sanitary, welfare, and safety arrangements.

Underground and surface sanitary, welfare, and safety arrangements in accordance with the recommendations of the United States Public Health Service and United States Bureau of Mines.

REFERENCES: For United States Bureau of Mines, see Chapter I of this title. For United States Public Health Service, Department of the Treasury, see 42 CFR I.

1. Reports of accidents, inundations or fires to be promptly mailed; accidents and serious or threatening damages to be reported by telegraph or telephone.

2. Reports of all accidents, inundations or fires shall be promptly mailed to the district mining supervisor by the mine or his representatives. Fatal accidents and serious or threatening damages to the mine, the leased lands, or persons, shall be reported to the district mining supervisor by telegraph or telephone.

3. Protection of employees; mechanical equipment; dangerous walks or passages; moving parts of machinery or belts.

4. Employees while in the mine or necessary plants shall be afforded all the protection to life and health. Mechanical equipment used for the transportation of men shall be of a safe character for the work it is used for.

5. At dangerous walks or passages, adequate shelter holes shall be provided, guard rails or fences shall be provided, and warning signs shall be provided.

6. All moving parts of machinery, when endangering employees or persons, shall be adequately guarded.

#### § 231.12 Lessee shall observe good practice.

The lessee shall observe good practice in prospecting and mining, sinking wells, shafts, and winzes, driving drifts and tunnels, stoping, blasting, transporting ore materials, hoisting, the use of explosives, timbering, pumping, and other operations for the development and preservation of any operation, mine, or mine equipment on the lease.

#### § 231.13 Operations shall be conducted in a manner to yield ultimate maximum recovery; information recorded and copy furnished district mining supervisor.

Mining operations shall be conducted in a manner to yield the ultimate maximum recovery of the mineral deposits. All shafts, main exits, and passageways, as well as overlying beds or mineral deposits that at a future date may be of economic importance, shall be protected by adequate pillars in the deposit being worked. Information obtained regarding the mineral deposit being worked and other mineral deposits on the leased lands shall be fully recorded and a copy of the record furnished to the district mining supervisor.

#### § 231.14 Sufficient pillars shall be left.

Sufficient pillars shall be left in first mining to insure the ultimate maximum recovery when the time arrives for the removal of pillars. Boundary pillars shall in no case be less than 50 feet thick unless otherwise specified in writing by the mining supervisor. Boundary and other main pillars shall be mined only with the written consent or by order of the mining supervisor or his authorized subordinates.

#### § 231.15 Working places; traveling way.

All working places shall be visited at least once during each shift by the mine foreman or his assistants, and there shall be provided adequate timber distributed throughout the mine for the usual daily uses. The roof and sides of every traveling way and each working place shall be made secure when necessary.

practice and the lessee shall not permit anyone to travel on or work in any traveling way or working place which is not secure, unless appointed for the purpose of exploring, inspecting, or repairing same.

#### § 231.16 Mining or prospecting minerals soluble in water; brines; minerals taken in solution.

In mining or prospecting deposits of potassium or other minerals soluble in water, all wells, shafts, prospect holes, and other openings shall be adequately protected with neat cement against the coursing or entrance of water; and the lessee shall, on orders of the district mining supervisor, back fill with rock or other suitable material to protect the roof from breakage when there is a danger of the entrance of water. On leased lands containing brines, due precaution shall be exercised to prevent the deposits becoming diluted or contaminated by the mixture of water or valueless solution; and, where the minerals are taken from the earth in solution, such extraction shall not be within 500 feet of the boundary line of the leased lands without the written permission of the Secretary of the Interior.

#### PROTECTION AGAINST MINE HAZARDS

#### § 231.17 Dust, fumes, and acids.

In the mining and milling or treating of the ores or mined products, the employees shall be adequately protected from injurious fumes, acids, dusts, and harmful or dangerous conditions. In mines where siliceous or other harmful dusts are formed, drilling machines shall be of the water-injection type and sprays shall be used to wet down the dust.

#### § 231.18 Ventilation.

Lessees shall provide and maintain for each underground operation on any lease a good and sufficient amount of ventilation for such men and animals as may be employed therein, and shall cause an adequate quantity of normal air to circulate through and into all the shafts, winzes, levels, and all working places of such mine. A working place, entry, or passageway shall not be deemed normally

chemical analysis to contain on a moisture-free basis more than 1¼ percent carbon dioxide or less than 19½ percent oxygen. The lessee, upon being notified of such finding, shall immediately undertake measures to improve the quality of the air of said working place or entry. Where natural ventilation does not furnish a positive current of air, ventilating fans shall be provided. Fans when installed shall have fireproof housing and surface fans shall be so arranged that the ventilating current can be quickly reversed.

#### § 231.19 Inflammable gas and dust.

Mines in which inflammable gas is found or explosive dust produced shall be subject to the coal-mining operating regulations covering these hazards.

CROSS REFERENCE: For coal-mining operating regulations, see Part 211 of this chapter.

#### § 231.20 Explosives.

The lessee shall store, thaw, transport, issue, and use explosives only in the most approved manner and with due regard for the safety and welfare of the employees and protection of property and in accord with instructions or notices issued by the district mining supervisor.

#### § 231.21 Electricity.

Electric circuits with potential of more than 600 volts shall be conducted in or through a mine only through insulated lead-covered armored cables, with the armor electrically continuous throughout and grounded, and may only be used for transmission or for application to transformers, motors, or other apparatus in which the whole of the high-voltage winding is stationary. Electric circuits of between 300 and 600 volts may be used only for stationary motors. All portable motors, such as locomotive mining machinery and portable pumps or portable fans, shall use current of less than 300 volts. All electric wires and appliances shall be installed, maintained, and used so as to insure safety to the employees and the mine and be in accord with the recommendations of the United States Bureau of Mines.

shall be adequately protected with cement or other suitable materials against the coursing or entrance of water. The operator/lessee shall, when ordered by the authorized officer, backfill with rock or other suitable material to protect the roof from breakage when there is a danger of the entrance of water.

(b) On leased, license or permit lands containing brines, due precaution shall be exercised to prevent the deposit from becoming diluted or contaminated by the mixture of water or valueless solution.

(c) Where minerals are taken from the earth in solution, such extraction shall not be within 500 feet of the boundary line of lands contained in the approved mine plan without the written permission of the authorized officer.

(d) Any agreement necessary for allocation of brine production shall be made a part of the mine plan.

#### **Subpart 3595—Protection Against Mining Hazards**

##### **§ 3595.1 Surface openings.**

(a) The operator/lessee shall substantially fill in, fence, protect or close all surface openings, subsidence holes, surface excavations or workings which are a hazard to people or animals. Such protective measures shall be maintained in a secure condition during the term of the lease, license or permit. Before abandonment of operations, all openings, including water discharge points, shall be closed to the satisfaction of the authorized officer.

(b) Reclamation or protection of surface areas no longer needed for operations will commence without delay. The authorized officer shall designate such areas where restoration or protective measures, or both shall be taken.

(c) Wells utilized for operations involving solution mining or brine extraction shall be abandoned in accordance with the approved mine plan.

##### **§ 3595.2 Abandonment of underground workings.**

No underground workings or part thereof shall be permanently abandoned and rendered inaccessible with-

out the advance, written approval of the authorized officer.

#### **Subpart 3596—Waste From Mining Milling**

##### **§ 3596.1 Milling.**

The operator/lessee shall conduct milling operations in accordance with the established requirements. The operator/lessee shall use due diligence in the reduction, concentration or separation of mineral substances by mechanical or chemical processes by other means so that the percentage of salts, concentrates, or other mineral substances recovered and waste generated shall be in accordance with approved practices.

##### **§ 3596.2 Disposal of waste.**

The operator/lessee shall dispose of all wastes resulting from the mining, reduction, concentration or separation of mineral substances in accordance with the terms of the lease, approved mining plan, applicable Federal, State and local law and regulations and the directions of the authorized officer.

#### **Subpart 3597—Production Records**

##### **§ 3597.1 Books of account.**

(a) Operators/lessees shall maintain records which show a correct account of all ore and rock mined, of all ore put through the processing plant, of all mineral products produced and of all ore and mineral products sold. The records shall show all relevant quality analyses of ore mined, processed, sold and the percentage of the mineral products recovered or lost.

(b) Production records shall be made available for examination by the authorized officer during regular business hours. For the purpose of production verification, the authorized officer may request, and the operator/lessee shall submit a copy of any portion of the production records not submitted to the Minerals Management Service as part of the operator's/lessee's production reporting.

##### **§ 3597.2 Audits.**

(a) An audit of the operator's/lessee's accounts and books may be made



**Subpart 3572—Maps and Plans****§ 3572.1 Operating plans.**

(a) *General.* Before conducting any operations under a permit or lease, the operator shall submit, in quintuplicate, to the authorized officer for approval an exploration or mining plan which shall show in detail the proposed exploration, prospecting, testing, development, or mining operations to be conducted. Exploration and mining plans shall be consistent with and responsive to the requirements of the lease or permit for the protection of nonmineral resources and for the reclamation of the surface of the lands affected by the operations. The authorized officer shall consult with the other agencies involved, and shall promptly approve the plans or indicate what modifications of the plans are necessary to conform to the provisions of the applicable regulations and the terms and conditions of the permit or lease. No operations shall be conducted except under an approved plan.

(b) *Exploration plans.* The authorized officer may require that an exploration plan include any or all of the following:

(1) A description of the area within which exploration is to be conducted;

(2) Five copies of a suitable map or aerial photograph showing topographic, cultural, and drainage features;

(3) A statement of proposed exploration methods, i.e., drilling, trenching, etc., and the location of primary support roads and facilities;

(4) A description of measures to be taken to prevent or control fire, soil erosion, pollution of surface and ground water, pollution of air, damage to fish and wildlife or other natural resources, and hazards to public health and safety both during and upon abandonment of exploration activities.

(c) *Mining plans.* The authorized officer may require that a mining plan include any or all of the following:

(1) A description of the location and area to be affected by the operations;

(2) Five copies of a suitable map, or aerial photograph showing the topography of the area covered by the permit

or lease, the name and location of major topographic and cultural features, and the drainage plan away from the area affected;

(3) A statement of proposed methods of operating, including a description of the surface or underground mining methods; the proposed roads or vehicular trails; the size and location of structures and facilities to be built;

(4) An estimate of the quantity of water to be used and pollutants that are expected to enter any receiving waters;

(5) A design for the necessary impoundment, treatment or control of all runoff water and drainage from workings so as to reduce soil erosion and sedimentation and to prevent the pollution of receiving waters;

(6) A description of measures to be taken to prevent or control fire, soil erosion, pollution of surface and ground water, pollution of air, damage to fish and wildlife or other natural resources, and hazards to public health and safety;

(7) A statement of the proposed manner and time of performance of work to reclaim areas disturbed by the operations.

(d) *Revegetation; regrading; backfilling.* In those instances in which the permit or lease requires the revegetation of an area to be affected by operations the exploration or mining plan shall show:

(1) Proposed methods of preparation and fertilizing the soil prior to replanting;

(2) Types and mixtures of shrubs, trees, or tree seedlings, grasses or legumes to be planted; and

(3) Types and methods of planting, including the amount of grasses or legumes per acre, or the number and spacing of trees, or tree seedlings, or combinations of grasses and trees.

If the permit or lease requires regrading and backfilling, the exploration or mining plan shall show the proposed methods and the timing of grading and backfilling of areas of lands affected by the operations.

(e) *Changes in plans.* Exploration and mining plans may be changed by mutual consent of the authorized officer and the operator at an

adjust to changed conditions or to correct an oversight. To obtain approval of a changed or supplemental plan the operator shall submit a written statement of the proposed changes or supplement and the justification for the changes proposed.

(f) *Partial plan.* If circumstances warrant, or if development of an exploration or mining plan for the entire operation is dependent upon unknown factors which cannot or will not be determined except during the progress of the operations, a partial plan may be approved and supplemented from time to time. The operator shall not, however, perform any operation except under an approved plan.

[37 FR 11041, June 1, 1972. Redesignated and amended at 48 FR 36588, 36589, Aug. 12, 1983]

**§ 3572.2 Maps of underground workings and surface operations and equipment.**

Maps of underground workings and surface operations shall be drawn to a scale acceptable to the authorized officer. All maps shall be appropriately marked with reference to Government land marks or lines and elevations with reference to sea level. When required by the authorized officer vertical projections and cross sections shall accompany plan views. Maps shall be based on accurate surveys made at least annually and as may be necessary at other times. Accurate copies of such maps on reproducible material or prints thereof shall be furnished the authorized officer when and as required. The maps shall be posted to date and submitted to the authorized officer at least once each year. The accuracy of maps furnished shall be certified by a professional engineer, professional land surveyor, or other professionally qualified person.

[37 FR 11041, June 1, 1972. Redesignated at 48 FR 36588, Aug. 12, 1983]

**§ 3572.3 Other maps.**

(a) The operator shall prepare such maps of the leased lands as in the judgment of the authorized officer are necessary to show the surface boundaries, improvements, and topography, including subsidence resulting from mining, and the geological conditions

so far as determined from out-drill holes, exploration or minor excavations in each separate deposit shall be shown in such manner that the production of mineral any royalty period can be accurately ascertained.

(b) In the event of the failure of an operator to furnish the maps required the authorized officer shall employ a competent mine surveyor to make a survey and maps of the mine, and the cost thereof shall be charged to and promptly paid by the operator.

(c) If any map submitted by an operator is believed to be incorrect, the authorized officer may cause a survey to be made, and if the survey shows the map submitted by the operator to be substantially incorrect in whole or in part, the cost of making the survey and preparing the map shall be charged to and promptly paid by the operator.

[37 FR 11041, June 1, 1972. Redesignated at 48 FR 36588, Aug. 12, 1983]

**Subpart 3573—Bore Holes and Samples****§ 3573.1 Core or test hole, cores, and cuttings, mill products.**

(a) The operator shall submit promptly to the authorized officer signed copies, in duplicate, of records of all core or test holes made on leased or permit lands, the records to be in such form that the position and direction of the holes can be accurately located on a map. The records shall include a log of all strata penetrated and conditions encountered, such as water, quicksand, gas, or unusual conditions, and copies of analyses of samples analyzed from strata penetrated shall be transmitted to the authorized officer as soon as obtained at such time as specified by the authorized officer. All drill holes will be logged under supervision of a competent geologist or engineer, and the logs will furnish to the authorized officer a detailed lithologic log of each drill hole and all other in-hole surveys such as electric logs, gamma ray logs, neutron logs, sonic logs or any other logs produced. The core or test hole logs shall be retained by the operator for



order, of all operations conducted on the bore hole. (See § 3470.0-2(b) of this title)

[48 FR 44795, Sept. 30, 1983]

### Subpart 3572—Maps and Plans

#### § 3572.1 Operating plans.

(a) *General.* Before conducting any operations under a permit or lease, the operator shall submit, in quintuplicate, to the authorized officer for approval an exploration or mining plan which shall show in detail the proposed exploration, prospecting, testing, development, or mining operations to be conducted. Exploration and mining plans shall be consistent with and responsive to the requirements of the lease or permit for the protection of nonmineral resources and for the reclamation of the surface of the lands affected by the operations. The authorized officer shall consult with the other agencies involved, and shall promptly approve the plans or indicate what modifications of the plans are necessary to conform to the provisions of the applicable regulations and the terms and conditions of the permit or lease. No operations shall be conducted except under an approved plan.

(b) *Exploration plans.* The authorized officer may require that an exploration plan include any or all of the following:

(1) A description of the area within which exploration is to be conducted;

(2) Five copies of a suitable map or aerial photograph showing topographic, cultural, and drainage features;

(3) A statement of proposed exploration methods, i.e., drilling, trenching, etc., and the location of primary support roads and facilities;

(4) A description of measures to be taken to prevent or control fire, soil erosion, pollution of surface and ground water, pollution of air, damage to fish and wildlife or other natural resources, and hazards to public health and safety both during and upon abandonment of exploration activities.

(c) *Mining plans.* The authorized officer may require that a mining plan include any or all of the following:

(1) A description of the location and area to be affected by the operations;

(2) Five copies of a suitable map, or aerial photograph showing the topography, the area covered by the permit or lease, the name and location of major topographic and cultural features, and the drainage plan away from the area affected;

(3) A statement of proposed methods of operating, including a description of the surface or underground mining methods; the proposed roads or vehicular trails; the size and location of structures and facilities to be built;

(4) An estimate of the quantity of water to be used and pollutants that are expected to enter any receiving waters;

(5) A design for the necessary impoundment, treatment or control of all runoff water and drainage from workings so as to reduce soil erosion and sedimentation and to prevent the pollution of receiving waters;

(6) A description of measures to be taken to prevent or control fire, soil erosion, pollution of surface and ground water, pollution of air, damage to fish and wildlife or other natural resources, and hazards to public health and safety;

(7) A statement of the proposed manner and time of performance of work to reclaim areas disturbed by the operations.

(d) *Revegetation; regrading; backfilling.* In those instances in which the permit or lease requires the revegetation of an area to be affected by operations the exploration or mining plan shall show:

(1) Proposed methods of preparation and fertilizing the soil prior to replanting;

(2) Types and mixtures of shrubs, trees, or tree seedlings, grasses or legumes to be planted; and

(3) Types and methods of planting, including the amount of grasses or legumes per acre, or the number and spacing of trees, or tree seedlings, or combinations of grasses and trees.

If the permit or lease requires regrading and backfilling, the exploration or mining plan shall show the proposed methods and the timing of

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and backfilling of areas of lands affected by the operations.

(e) *Changes in plans.* Exploration and mining plans may be changed by mutual consent of the authorized officer and the operator at any time to adjust to changed conditions or to correct an oversight. To obtain approval of a changed or supplemental plan the operator shall submit a written statement of the proposed changes or supplement and the justification for the changes proposed.

(f) *Partial plan.* If circumstances warrant, or if development of an exploration or mining plan for the entire operation is dependent upon unknown factors which cannot or will not be determined except during the progress of the operations, a partial plan may be approved and supplemented from time to time. The operator shall not, however, perform any operation except under an approved plan.

[37 FR 11041, June 1, 1972. Redesignated and amended at 48 FR 36588, 36589, Aug. 12, 1983]

#### § 3572.2 Maps of underground workings and surface operations and equipment.

Maps of underground workings and surface operations shall be drawn to a scale acceptable to the authorized officer. All maps shall be appropriately marked with reference to Government land marks or lines and elevations with reference to sea level. When required by the authorized officer vertical projections and cross sections shall accompany plan views. Maps shall be based on accurate surveys made at least annually and as may be necessary at other times. Accurate copies of such maps on reproducible material or prints thereof shall be furnished the authorized officer when and as required. The maps shall be posted to date and submitted to the authorized officer at least once each year. The accuracy of maps furnished shall be certified by a professional engineer, professional land surveyor, or other professionally qualified person.

[37 FR 11041, June 1, 1972. Redesignated at 48 FR 36588, Aug. 12, 1983]

#### § 3572.3 Other maps.

(a) The operator shall prepare maps of the leased lands under judgment of the authorized officer necessary to show the surface, improvements, and to include subsidence resulting from mining, and the geological so far as determined from drill holes, exploration or excavations in each separate deposit shall be shown in such that the production of mineral any royalty period can be ascertained.

(b) In the event of the failure of the operator to furnish the maps, the authorized officer shall cause a competent mine surveyor to survey and map of the mine cost thereof shall be charged promptly paid by the operator.

(c) If any map submitted by the operator is believed to be incorrect the authorized officer may cause a new map to be made, and if the survey is substantially incorrect in whole or in part, the cost of making the map and preparing the map shall be charged to and promptly paid by the operator.

[37 FR 11041, June 1, 1972. Redesignated and amended at 48 FR 36588, Aug. 12, 1983]

### Subpart 3573—Bore Holes and Samples

#### § 3573.1 Core or test hole, cores, cuttings, mill products.

(a) The operator shall promptly to the authorized officer signed copies, in duplicate, of all core or test holes made under leased or permit lands, the record in such form that the position of the holes can be accurately located on a map. The record shall include a log of all strata penetrated and conditions encountered, water, quicksand, gas, or unusual conditions, and copies of analyses of samples analyzed from strata penetrated shall be submitted to the authorized officer as soon as obtained at such time as required by the authorized officer. All drill holes



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, by the United States of America, the lessor,

10033 J. 1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100. 101. 102. 103. 104. 105. 106. 107. 108. 109. 110. 111. 112. 113. 114. 115. 116. 117. 118. 119. 120. 121. 122. 123. 124. 125. 126. 127. 128. 129. 130. 131. 132. 133. 134. 135. 136. 137. 138. 139. 140. 141. 142. 143. 144. 145. 146. 147. 148. 149. 150. 151. 152. 153. 154. 155. 156. 157. 158. 159. 160. 161. 162. 163. 164. 165. 166. 167. 168. 169. 170. 171. 172. 173. 174. 175. 176. 177. 178. 179. 180. 181. 182. 183. 184. 185. 186. 187. 188. 189. 190. 191. 192. 193. 194. 195. 196. 197. 198. 199. 200. 201. 202. 203. 204. 205. 206. 207. 208. 209. 210. 211. 212. 213. 214. 215. 216. 217. 218. 219. 220. 221. 222. 223. 224. 225. 226. 227. 228. 229. 230. 231. 232. 233. 234. 235. 236. 237. 238. 239. 240. 241. 242. 243. 244. 245. 246. 247. 248. 249. 250. 251. 252. 253. 254. 255. 256. 257. 258. 259. 260. 261. 262. 263. 264. 265. 266. 267. 268. 269. 270. 271. 272. 273. 274. 275. 276. 277. 278. 279. 280. 281. 282. 283. 284. 285. 286. 287. 288. 289. 290. 291. 292. 293. 294. 295. 296. 297. 298. 299. 300. 301. 302. 303. 304. 305. 306. 307. 308. 309. 310. 311. 312. 313. 314. 315. 316. 317. 318. 319. 320. 321. 322. 323. 324. 325. 326. 327. 328. 329. 330. 331. 332. 333. 334. 335. 336. 337. 338. 339. 340. 341. 342. 343. 344. 345. 346. 347. 348. 349. 350. 351. 352. 353. 354. 355. 356. 357. 358. 359. 360. 361. 362. 363. 364. 365. 366. 367. 368. 369. 370. 371. 372. 373. 374. 375. 376. 377. 378. 379. 380. 381. 382. 383. 384. 385. 386. 387. 388. 389. 390. 391. 392. 393. 394. 395. 396. 397. 398. 399. 400. 401. 402. 403. 404. 405. 406. 407. 408. 409. 410. 411. 412. 413. 414. 415. 416. 417. 418. 419. 420. 421. 422. 423. 424. 425. 426. 427. 428. 429. 430. 431. 432. 433. 434. 435. 436. 437. 438. 439. 440. 441. 442. 443. 444. 445. 446. 447. 448. 449. 450. 451. 452. 453. 454. 455. 456. 457. 458. 459. 460. 461. 462. 463. 464. 465. 466. 467. 468. 469. 470. 471. 472. 473. 474. 475. 476. 477. 478. 479. 480. 481. 482. 483. 484. 485. 486. 487. 488. 489. 490. 491. 492. 493. 494. 495. 496. 497. 498. 499. 500. 501. 502. 503. 504. 505. 506. 507. 508. 509. 510. 511. 512. 513. 514. 515. 516. 517. 518. 519. 520. 521. 522. 523. 524. 525. 526. 527. 528. 529. 530. 531. 532. 533. 534. 535. 536. 537. 538. 539. 540. 541. 542. 543. 544. 545. 546. 547. 548. 549. 550. 551. 552. 553. 554. 555. 556. 557. 558. 559. 560. 561. 562. 563. 564. 565. 566. 567. 568. 569. 570. 571. 572. 573. 574. 575. 576. 577. 578. 579. 580. 581. 582. 583. 584. 585. 586. 587. 588. 589. 590. 591. 592. 593. 594. 595. 596. 597. 598. 599. 600. 601. 602. 603. 604. 605. 606. 607. 608. 609. 610. 611. 612. 613. 614. 615. 616. 617. 618. 619. 620. 621. 622. 623. 624. 625. 626. 627. 628. 629. 630. 631. 632. 633. 634. 635. 636. 637. 638. 639. 640. 641. 642. 643. 644. 645. 646. 647. 648. 649. 650. 651. 652. 653. 654. 655. 656. 657. 658. 659. 660. 661. 662. 663. 664. 665. 666. 667. 668. 669. 670. 671. 672. 673. 674. 675. 676. 677. 678. 679. 680. 681. 682. 683. 684. 685. 686. 687. 688. 689. 690. 691. 692. 693. 694. 695. 696. 697. 698. 699. 700. 701. 702. 703. 704. 705. 706. 707. 708. 709. 710. 711. 712. 713. 714. 715. 716. 717. 718. 719. 720. 721. 722. 723. 724. 725. 726. 727. 728. 729. 730. 731. 732. 733. 734. 735. 736. 737. 738. 739. 740. 741. 742. 743. 744. 745. 746. 747. 748. 749. 750. 751. 752. 753. 754. 755. 756. 757. 758. 759. 760. 761. 762. 763. 764. 765. 766. 767. 768. 769. 770. 771. 772. 773. 774. 775. 776. 777. 778. 779. 780. 781. 782. 783. 784. 785. 786. 787. 788. 789. 790. 791. 792. 793. 794. 795. 796. 797. 798. 799. 800. 801. 802. 803. 804. 805. 806. 807. 808. 809. 810. 811. 812. 813. 814. 815. 816. 817. 818. 819. 820. 821. 822. 823. 824. 825. 826. 827. 828. 829. 830. 831. 832. 833. 834. 835. 836. 837. 838. 839.

the lessee.

Sec. 1. *Rights of lessee.* The lessor, in consideration of the rents and royalties to be paid and the conditions to be observed as hereinafter set forth, does hereby grant and lease to the lessee the exclusive right and privilege to mine and dispose of all the potassium and associated deposits; hereinafter referred to as leased deposits, in, upon, or under the following-described tracts situated in the State of **Utah**:

T. 2 S., R. 18 W., SLM, Utah  
Sec. 12, E $\frac{1}{2}$ ;  
Sec. 13, E $\frac{1}{2}$ .

(d) Minimum production. Beginning with the next lease anniversary date, this lease will require a minimum annual production or the payment of a minimum royalty of \$2 per acre per

the Producer Prices and Prices Indexes (Department of Labor, Bureau of Labor Statistics), unless (i) lease production is interrupted by strikes, the elements, or casualties not attributable to the lessee; or (ii) lease operations are suspended upon a satisfactory showing that market conditions are such that the lease cannot be operated except at a loss; or (iii) lease operations are suspended by the Secretary of the Interior for the reasons specified in Section 39 of the Mineral Leasing Act (30 U.S.C. 209).

(c) *Payments.* To make rental payments to the manager of the appropriate BLM office, except that when this lease becomes productive the rentals and royalties shall be paid to the appropriate regional mining supervisor of the Geological Survey, with whom all reports concerning operations under the lease shall be filed. All remittances to the manager of the appropriate BLM office shall be made payable to the Bureau of Land Management; those to the Geological Survey shall be made payable to the United States Geological Survey.

(f) *Plats, reports, maps.* At such times and in such form as the lessor may prescribe, to furnish a plat showing development work and improvements on the leased lands and a report with respect to stockholders, investment, depreciation, and costs. To furnish in such form as the lessor may prescribe, within 30 days from the expiration of each quarter a report covering such quarter, certified by the superintendent of the mine, or by such other agent, having personal knowledge of the facts as may be designated by the lessee for such purpose, showing the amount of leased deposits mined during the quarter, the character and quality thereof, amount of its products and byproducts disposed of and price received therefor, and amount in storage or held for sale. To keep and prepare maps of the leased lands in accordance with the appropriate regulations.

(g) *Weights.* To determine accurately the weight or quantity and quality of all leased deposits mined, and to enter accurately the weight or quantity and quality thereof in due form in books to be kept and preserved by the lessee for such purposes.

(h) *Inspection.* To permit at all reasonable times (1) inspection by any duly authorized officer of the Department, of the leased premises and all surface and underground improvements, works, machinery, equipment, and all books and records pertaining to operations and surveys or investigations under this lease; and (2) the lessor to make copies of and extracts from any or all books and records pertaining to operations under this lease, if desired.

(i) *Assignment.* To file for approval in the appropriate BLM office within 90 days from the date of execution, any assignment or transfer made of this lease, whether by direct assignment, operating agreement, working or royalty interest, or otherwise. Such instrument will take effect the first day of the month following its approval by the Bureau of Land Management, or if the assignee requests, the first day of the month of approval. The showing required to be made with an assignment or transfer is set forth in the appropriate regulations.

(j) *Equal Opportunity clause.* During the performance of this lease, the lessee agrees as follows:

(1) The lessee will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The lessee will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to the following: employment, upgrading,

promotion, or transfer, recruitment or recruitment advertising, layoff or termination; rates of pay or other forms of compensation, and selection for training, including apprenticeship. The lessee agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the lessor setting forth the provisions of this Equal Opportunity clause.

(2) The lessee will, in all solicitations or advertisements for employees placed by or on behalf of the lessee, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

(3) The lessee will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the agency contracting officer, advising the labor union or worker representative of the lessee's commitments under the Equal Opportunity clause, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(4) The lessee will comply with all provisions of Executive Order No. 11246 of September 24, 1965, as amended, and of the rules, regulations, and relevant orders of the Secretary of Labor.

(5) The lessee will furnish all information and reports required by Executive Order No. 11246 of September 24, 1965, as amended, and by the rules, regulations, and orders of the Secretary of Labor, pursuant thereto, and will permit access to his books, records, and accounts by the contracting agency or the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations and orders.

(6) In the event of the lessee's noncompliance with the Equal Opportunity clause of this lease or with any of the said rules, regulations, or orders, this lease may be cancelled, terminated or suspended in whole or in part and the lessee may be declared ineligible for further Government contracts or leases in accordance with procedures authorized in Executive Order No. 11246 of September 24, 1965, as amended, and such other sanctions may be imposed and remedies invoked as provided in Executive Order No. 11246 of September 24, 1965, as amended, or by rule, regulation, order of the Secretary of Labor, or as otherwise provided by law.

(7) The lessee will include the provisions of paragraphs (1) through (7) in every subcontract or purchase order unless exempted by rules, regulations or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order No. 11246 of September 24, 1965, as amended, so that such provisions will be binding upon each subcontractor or vendor. The lessee will take such action with respect to a subcontract or purchase order as the contracting agency may direct as a means of enforcing such provisions including sanctions for noncompliance: *Provided, however,* That in the event the lessee becomes involved in or is threatened with, litigation with a contractor, subcontractor, or vendor as a result of such direction from the contracting agency, the lessee may request the United States to enter into such litigation to protect the interests of the United States.

(k) *Certification of nonsegregated facilities.* In entering into this lease, the lessee certifies that it does not and will not maintain or provide for its employees any segregated facilities at any of its establishments, and that it does not and will not permit employees to perform their services at any location under its control, where segregated facilities are maintained. The lessee agrees that a breach of this certification is a violation of the Equal Opportunity clause of this lease. As used in this certification, the term "segregated facilities" means, but is not limited

ny waiting rooms, work areas, rest rooms and wash rooms, or restaurants or other eating areas, time clocks, or locker rooms, and other storage or dressing rooms, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities for employees which are segregated by explicit law are in fact segregated on the basis of race, color, religion, or national origin because of habit, local custom, or otherwise. Lessee further agrees that (except where it has obtained identical certifications from proposed contractors and subcontractors for specific time periods) it will obtain identical certifications from proposed contractors and subcontractors prior to the award of contracts or subcontracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity clause; that it will retain such certifications in its files; and that it will forward the following certification to such proposed contractors and subcontractors (except where the proposed contractor or subcontractor has submitted identical certifications for specific time periods); it will notify prospective contractors and subcontractors of requirement for certification of nonsegregated facilities. A Certification of Nonsegregated Facilities, as required by the May 9, 1967 Order (32 F.R. 7439, May 19, 1967) on Elimination of Segregated Facilities, by the Secretary of Labor, must be submitted prior to the award of a contract or subcontract exceeding \$10,000 which is not exempt from the provisions of the Equal Opportunity clause. The certification may be submitted either for each contract and subcontract or for all contracts and subcontracts during a period (i.e., quarterly, semi-annually, or annually).

(l) *Lands disposed of with potassium deposits reserved to the United States.* If the lands embraced herein have been or shall hereafter be disposed of under law serving to the United States the deposits of potassium therein to comply with all conditions as are hereafter provided by the laws and regulations reserving such deposits.

(m) *Operations, wages, and freedom to purchase.* To comply with the appropriate operating regulations, to exercise reasonable diligence, skill, and care in the operation of the property, and to carry on all operations in accordance with approved methods and practices as provided in the operating regulations, having due regard for the prevention of injury to life, health, or property, and of waste or damage to any water or mineral deposits; to pay all wages due miners and employees both above and below ground, at least twice each month in lawful money of the United States, to accord all miners and employees complete freedom of purchase, to restrict the workday to not exceed 8 hours in any one day for underground workers, except in cases of emergency, to employ no boy or girl under the age of 16, in any mine below the surface, unless the laws of the State otherwise provide; in which case the State laws control.

(n) *Taxes.* To pay when due all taxes lawfully assessed and levied under the laws of the State or the United States upon improvements, output of mines, or other rights, property or assets of the lessee.

(o) *Overriding royalties.* Not to create, by assignment or otherwise, an overriding royalty interest in excess of 1 percent of the gross value of the output at the point of shipment to market unless the owner of that interest files his agreement in writing that such interest is subject to reduction or suspension to a total of less than 1 percent of such gross value, whenever, in the interest of conservation, it appears necessary to do so in order to (1) prevent premature abandonment, or (2) make possible the economic mining of marginal or low-grade deposits on the leased lands or any part thereof.

(p) *Delivery of minerals in case of forfeiture.* In case of forfeiture of this lease to deliver up to the lessor in good order and condition the land leased, including all buildings and underground timbering, and such other supports and structures as are necessary for the preservation of the mine or deposits.

(q) *Extraction by solution.* Where the minerals are taken from the earth in solution, with the express consent of the lessor which must be first had and obtained, such extraction shall not be within 500 feet of the boundary line of the leased lands without the permission of, or unless directed by, the lessor.

### Sec. 3. The lessor expressly reserves:

(a) *Rights reserved.* The right to permit for joint or several use such easements or rights-of-way, including easements in tunnels, upon, through, or in the land leased, occupied, or used as may be necessary or appropriate to the working of the same or other lands containing the deposits described in the Act, and the treatment and shipment of the products thereof by or under authority of the Government, its lessees or permittees, and for other public purposes.

(b) *Disposition of surface.* The right to lease, sell, or otherwise dispose of the surface of the leased lands under existing law or laws hereafter enacted, insofar as said surface is not necessary for the use of the lessee in the extraction and removal of the leased deposits therein, or to dispose of any resource in such lands which will not unreasonably interfere with the operations under this lease.

(c) *Monopoly and fair prices.* Full power and authority to promulgate and enforce all orders and regulations issued under the provisions of Sec. 30 of the Act, as amended, necessary to insure the sale of the production of said lands to the United States and to the public at reasonable prices, to prevent monopoly, and to safeguard the public welfare.

(d) *Readjustment of terms.* The right reasonably to readjust and fix royalties payable hereunder and other terms and conditions at the end of 20 years from ~~the date hereof~~ and thereafter at the end of each succeeding 20-year period during the continuance of this lease unless otherwise provided by law at the time of the expiration of any such period. Unless the lessee filed objections to the proposed terms or a relinquishment of the lease within 30 days after receipt of the notice of proposed terms for a 20-year period, he will be deemed to have agreed to such terms.

(e) *Waiver of conditions.* The right to waive any breach of conditions herein, except the breach of such conditions as are required by the Act, as amended, but any such waiver shall extend only to the particular breach so waived and shall not limit the rights of the lessor with respect to any future breach; nor shall the waiver of a particular cause of forfeiture prevent cancellation of this lease for any other cause, or for the same cause occurring at another time.

Sec. 4 *Relinquishment of lease.* Upon a satisfactory showing that the public interest will not be impaired, the lessee may surrender the entire lease or any legal subdivision thereof. A relinquishment must be filed in duplicate in the appropriate BLM office. Upon its acceptance it shall be effective as of the date it is filed, subject to the continued obligation of the lessee and his surety to make payment of all accrued rentals and royalties, and to provide for the preservation of any mines or productive works or permanent improvements on the leased lands in accordance with the regulations and terms of the lease.

Sec. 5 *Protection of surface.* The lessee agrees to take such

... shall remove any of the property... directed by the lessor.

Sec. 5. *Procedural provisions in case of default.* If the lessee shall not comply with any of the provisions of the act as amended, or the regulations thereunder or default in the performance or observance of any of the provisions of this lease and such default shall continue for a period of 30 days after service of written notice thereof by the lessor, the lessor may institute appropriate proceedings in a court of competent jurisdiction for the forfeiture and cancellation of this lease as provided in sec. 31 of the Mineral Leasing Act. If the lessee fails to take prompt and necessary steps to prevent loss or damage to the mine, property, or premises, or danger to the employees, the lessor may enter on the premises and take such measures as may be deemed necessary to prevent such loss or damage or to correct the dangerous or unsafe condition of the mine or works hereof, which shall be at the expense of the lessee. However, the lessee shall not be held responsible for delays or casualties occasioned by causes beyond the lessee's control.

Sec. 6. *Antiquities and objects of historic value.* When American antiquities or other objects of historic or scientific interest including, but not limited to, historic or prehistoric ruins, fossils or artifacts are discovered in the performances of this lease, the item(s) or condition(s) will be left intact and immediately brought to the attention of the contracting officer or his authorized representative.

Sec. 7. *Removal of equipment, etc. on termination of lease.* Upon termination of this lease, by surrender or forfeiture, the lessee shall have the privilege at any time within a period of 90 days thereafter of removing from the premises all machinery, equipment, tools, and materials, other than underground timbering placed by the lessee in or on the leased lands, which are not necessary for the preservation of the mine. Any materials, tools, appliances, machinery, structures, and equipment, subject to removal as above provided, which are allowed to remain on the leased lands shall become the property of the lessor on expiration of the 90-day period or such extension thereof as may be granted, but

... shall remove any of the property... directed by the lessor.

Sec. 8. *Procedural provisions in case of default.* If the lessee shall not comply with any of the provisions of the act as amended, or the regulations thereunder or default in the performance or observance of any of the provisions of this lease and such default shall continue for a period of 30 days after service of written notice thereof by the lessor, the lessor may institute appropriate proceedings in a court of competent jurisdiction for the forfeiture and cancellation of this lease as provided in sec. 31 of the Mineral Leasing Act. If the lessee fails to take prompt and necessary steps to prevent loss or damage to the mine, property, or premises, or danger to the employees, the lessor may enter on the premises and take such measures as may be deemed necessary to prevent such loss or damage or to correct the dangerous or unsafe condition of the mine or works hereof, which shall be at the expense of the lessee. However, the lessee shall not be held responsible for delays or casualties occasioned by causes beyond the lessee's control.

Sec. 9. *Heirs and successors in interest.* Each obligation hereunder shall extend to and be binding upon, and every benefit hereof shall inure to the heirs, executors, administrators, successors, or assigns of the respective parties hereto.

Sec. 10. *Unlawful interest.* No Member of, or Delegate to, Congress, or Resident Commissioner, after his election or appointment, or either before or after he has qualified and during his continuance in office, and no officer, agent, or employee of the Department of the Interior, except as provided in the appropriate regulations, shall be admitted to any share or part in this lease or derive any benefit that may arise therefrom; and the provisions of sec. 3741 of the Revised Statutes of the United States, as amended (41 U.S.C. sec. 22), and secs. 431, 432, and 433, Title 18 U.S.C., relating to contracts, enter into and form a part of this lease so far as the same may be applicable.

SIGNATURE OF LESSEE(S)  
KAISER ALUMINUM & CHEMICAL CORPORATION

THE UNITED STATES OF AMERICA

By: W. F. Smith

By: Irene J. Anderson

(Authorized Officer)

Vice President

Acting

CHIEF, MINERALS SECTION

(Title)

(Date)

AUG 22 1983

(Date)

If this lease is executed by a corporation, it must bear the corporate seal

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

Serial Number

POTASSIUM

LEASE

U-37864

PART I. LEASE RIGHTS GRANTED.

This ☒ Lease ☐ Lease Renewal entered into by and between the UNITED STATES OF AMERICA, through the Bureau of Land Management, hereinafter called lessor, and (Name and Address)

Crystal Peak Minerals Corporation  
P.O. Box 100, Milford, Utah 84751

hereinafter called lessee, is effective (date) JAN 1 1988, for a period of 20 years,

Sodium, Sulphur, Hardrock -

☐ with preferential right in the lessee to renew for successive periods of years under such terms and conditions as may be prescribed by the Secretary of the Interior, unless otherwise provided by law at the expiration of any period.

Potassium, Phosphate, Gilsonite -

☒ and for so long thereafter as lessee complies with the terms and conditions of this lease which are subject to readjustment at the end of each 20 year period, unless otherwise provided by law.

Sec. 1. This lease is issued pursuant and subject to the terms and provisions of the:

☒ Mineral Leasing Act of 1920, as amended, and supplemented, 41 Stat. 437, 30 U.S.C. 181-287, hereinafter referred to as the Act;

☐ Mineral Leasing Act for Acquired Lands, Act of August 7, 1947, 61 Stat. 913, 30 U.S.C. 351-359;

☐ Reorganization Plan No. 3 of 1946, 60 Stat. 1099 and 43 U.S.C. 1201;

☐ (Other)

; and

to the regulations and general mining orders of the Secretary of the Interior in force on the date this lease issued.

c. 2. Lessor, in consideration of any bonuses, rents, and royalties to be paid, and the conditions and covenants to be observed as herein set forth, hereby grants and leases to lessee the exclusive right and privilege to explore for, drill for, mine, extract, remove, beneficiate, concentrate, or otherwise process and dispose of the potassium deposits or any potassium compound hereinafter referred to as "leased deposits," in, upon, or under the following described lands: and associated and related minerals

T. 21 S., R. 11 W., SLM, Utah

Sec. 31, all.

T. 22 S., R. 11 W., SLM, Utah

Sec. 3, all;

Sec. 4, all;

Sec. 5, all.

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containing acres, more or less, together with the right to construct such works, buildings, plants, structures, equipment and appliances and the right to use such on-lease rights-of-way which may be necessary and convenient in the exercise of the rights and privileges granted, subject to the conditions herein provided.

phosphate -

☐ In accordance with Section 11 of the Act (30 U.S.C. 213), lessee may use deposits of silica, limestone, or other rock in the processing or refining of the phosphates, phosphate rock, and associated or related minerals mined from the leased lands or other lands upon payments of royalty as set forth on the attachment to this lease. (Phosphate leases only.)

## PART II. TERMS AND CONDITIONS

**Sec. 1. (a) RENTAL RATE** - Lessee shall pay lessor rental annually and in advance for each acre or fraction thereof during the continuance of the lease at the rate indicated below:

**Sulphur, Gilsonite -**

☐ 50 cents for the first lease year and each succeeding lease year;

**Hardrock -**

☐ \$1 for the first lease year and \$1 for each succeeding lease year;

**Phosphate -**

☐ 25 cents for the first lease year, 50 cents for the second and third lease years, and \$1 for each and every lease year thereafter;

**Potassium, Sodium -**

☒ 25 cents for the first calendar year or fraction thereof, 50 cents for the second, third, fourth, and fifth calendar years respectively, and \$1 for the sixth and each succeeding calendar year; or

**Sodium, Sulphur, Asphalt, and Hardrock Renewal Leases -**

☐ \$ for each lease year;

(b) **RENTAL CREDITS** - The rental for any year will be credited against the first royalties as they accrue under the lease during the year for which rental was paid.

### SEE ATTACHMENT - PRODUCTION ROYALTIES

**Sec. 2. (a) PRODUCTION ROYALTIES** - Lessee shall pay lessor a production royalty in accordance with the attached schedule. Such production royalty is due the first day of the month next following the month in which the minerals are sold or removed from the leased lands.

### SEE ATTACHMENT - MINIMUM ANNUAL PRODUCTION

(b) **MINIMUM ANNUAL PRODUCTION AND MINIMUM ROYALTY** - (1) Lessee shall produce on an annual basis a minimum amount of , except when production is interrupted by strikes, the elements, or casualties not attributable to the lessee. Lessor may permit suspension of operations under the lease when marketing conditions are such that the lease cannot be operated except at a loss. (2) At the request of the lessee, made prior to initiation of the lease year, the authorized officer may allow in writing the payment of a \$3.00 per acre or fraction thereof minimum royalty in lieu of production for any particular lease year. Minimum royalty payments shall be credited to production royalties for that year.

**Sec. 3. REDUCTION AND SUSPENSION** - In accordance with Section 39 of the Mineral Leasing Act, 30 U.S.C. 209, the lessor reserves the authority to waive, suspend or reduce rental or minimum royalty, or to reduce royalty, and reserves the authority to assent to or order the suspension of this lease.

**Sec. 4. BONDS** - Lessee shall maintain in the proper office a lease bond in the amount of \$5,000 , or in lieu thereof, an acceptable statewide or nationwide bond. The authorized officer may require an increase in this amount when additional coverage is determined appropriate.

**Sec. 5. DOCUMENTS, EVIDENCE AND INSPECTION** - At such times and in such form as lessor may prescribe, lessee

shall furnish detailed statements showing the quantity and quality of all products removed and sold from the leased lands, the proceeds therefrom, and the amount used for production purposes or unavoidably lost.

Lessee shall keep open at all reasonable times for the inspection of any duly authorized officer of lessor, the leased premises and all surface and underground improvements, work, machinery, ore stockpiles, equipment, and all books, accounts, maps, and records relative to operations, surveys, or investigations on or under the leased lands.

Lessee shall either submit or provide lessor access to and copying of documents reasonably necessary to verify lessee compliance with terms and conditions of the lease.

While this lease remains in effect, information obtained under this section shall be closed to inspection by the public in accordance with the Freedom of Information Act (5 U.S.C. 552).

**Sec. 6. DAMAGES TO PROPERTY AND CONDUCT OF OPERATIONS** - Lessee shall exercise reasonable diligence, skill, and care in the operation of the property, and carry on all operations in accordance with approved methods and practices as provided in the operating regulations, having due regard for the prevention of injury to life, health or property, and of waste or damage to any water or mineral deposits.

Lessee shall not conduct exploration or operations, other than casual use, prior to receipt of necessary permits or approval of plans of operations by lessor.

Lessee shall carry on all operations in accordance with approved methods and practices as provided in the operating regulations, and the approved mining plans in a manner that minimizes adverse impacts to the land, air, and water, to cultural, biological, visual, minerals, and other resources, and to other land uses or users. Lessee shall take measures deemed necessary by lessor to accomplish the intent of this lease term. Such measures may include, but are not limited to, modification to proposed siting or design of facilities, timing of operations, and specification of interim and final reclamation procedures.

Lessor reserves to itself the right to lease, sell, or otherwise dispose of the surface or other mineral deposits in the lands and the right to continue existing uses and to authorize future uses upon or in the leased lands, including issuing leases for mineral deposits not covered hereunder or the approval of easements or rights-of-way. Lessor shall condition such uses to prevent unnecessary or unreasonable interference with rights of lessee as may be consistent with concepts of multiple use and multiple mineral development.

**Sec. 7. PROTECTION OF DIVERSE INTERESTS, AND EQUAL OPPORTUNITY** - Lessee shall: pay when due all taxes legally assessed and levied under the laws of the State or the United States; accord all employees complete freedom of purchase; pay all wages at least twice each month in lawful money of the United States; maintain a safe working environment in accordance with standard industry practices; restrict the workday to not more than 8 hours in any one day for underground workers, except in emergencies; and take measures necessary to protect the health and safety of the public. No person under the age of 16 years shall be employed in any mine below the surface. To the extent that laws of the State in which the lands are

more restrictive than the provisions in this paragraph, then the State laws apply.

Lessee will comply with all provisions of Executive Order 11246 of September 24, 1965, as amended, and the rules, regulations, and relevant orders of the Secretary of Labor. Neither lessee nor lessee's subcontractors shall maintain segregated facilities.

Sec. 8. (a) TRANSFERS - This lease may be transferred in whole or in part to any person, association or corporation qualified to hold such lease interest.

(b) RELINQUISHMENT - The lessee may relinquish in writing at any time all rights under this lease or any portion thereof as provided in the regulations. Upon lessor's acceptance of the relinquishment, lessee shall be relieved of all future obligations under the lease or the relinquished portion thereof, whichever is applicable.

Sec. 9. DELIVERY OF PREMISES, REMOVAL OF MACHINERY, EQUIPMENT, ETC. - At such time as all or portions of this lease are returned to lessor, lessee shall deliver up to lessor the land leased, underground timbering, and such other supports and structures necessary for the preservation of the mine workings on the leased premises or deposits and place all wells in condition for suspension or abandonment. Within 180 days thereof, lessee shall remove from the premises all other structures, machinery, equipment, tools, and materials that it elects to or as required by the authorized officer. Any such structures, machinery, equipment, tools, and materials remaining on the leased lands beyond 180 days, or approved extension thereof, shall become the property of the lessor, but lessee shall either remove any or all such property or shall continue to be liable for the cost of removal and disposal in the amount actually incurred by the lessor. If the surface is needed by third parties, lessor shall waive the requirement for removal, provided the third parties do not object to such

waiver. Lessee shall, prior to the termination of the lease, or at any other time when required, comply with all applicable laws and regulations relating to the surface of which has been disturbed, including all debris or solid waste, repair the offsite and on-site damage caused by lessee's activity or activities on the leased lands, and reclaim access roads or trails.

Sec. 10. PROCEEDINGS IN CASE OF DEFAULT - If lessee fails to comply with applicable laws, now existing regulations, or the terms, conditions and stipulations of this lease, and the noncompliance continues for 30 days after written notice thereof, this lease shall be subject to cancellation by the lessor only by judicial proceedings. This provision shall not be construed to prevent the exercise by lessor of any other legal and equitable remedy, including waiver of the default. Any such remedy or waiver shall not prevent later cancellation for the same default occurring at any other time.

Sec. 11. HEIRS AND SUCCESSORS-IN-INTEREST - Each obligation of this lease shall extend to and be binding upon, and every benefit hereof shall inure to, the heirs, executors, administrators, successors, or assigns of the respective parties hereto.

Sec. 12. INDEMNIFICATION - Lessee shall indemnify and hold harmless the United States from any and all claims arising out of the lessee's activities and operations under this lease.

Sec. 13. SPECIAL STATUTES - This lease is subject to the Federal Water Pollution Control Act (33 U.S.C. 1151-1175), the Clean Air Act (42 U.S.C. 1857 et. seq.), and to all other applicable laws pertaining to exploration activities, mining operations and reclamation.

Sec. 14. SPECIAL STIPULATIONS - SEE ATTACHMENT - SPECIAL STIPULATIONS



THE UNITED STATES OF AMERICA

This information is being collected for use in calculating royalty payments and in verification of compliance with lease terms. Response to this request is mandatory only if the lessee elects to mine, extract, remove and/or dispose of the leased deposits.



SPECIAL STIPULATIONS  
POTASSIUM PREFERENCE RIGHT LEASES  
U-37863 THROUGH U-37912

1. The dust from the Black Rock Road, parking lots, and other roads will be reduced by spraying Magnesium Chloride on the smooth surface.
2. The borrow pits will be sloped and shaped so the pits will appear a wide spot in a draw. Each borrow pit will be designed with a livestock/wildlife pond in it which shall catch precipitation runoff. The catchment ponds will be built so animals could enter the water, drink and safely exit. Once construction is completed and equipment is not disturbing the soil, all areas which are not occupied by roads, structures, parking lots, powerline, etc. will be seeded with the following mix:

<u>SEED</u>	<u>POUNDS PER ACRE</u>
Indian Ricegrass	$\frac{1}{2}$
Prostrate Kosha	1
Ephraim Crested Wheatgrass	3
Winterfat	$\frac{1}{2}$

This seed will not be used in areas of high salt concentration, i.e., on dikes or near the salt storage piles, but all viable areas, i.e., borrow pits, well field, powerline, etc. will be seeded.

Top soil from the borrow pits will be stockpiled, then spread over the pits as part of the site rehabilitation.

3. Crystal Peak Minerals Corporation shall place a water tap in the process water line so BLM can supply water to livestock/wildlife.
4. Crystal Peak Minerals Corporation will insure that eagle perches will be built every .5 mile along the powerline. The perches would be built in accordance with REA Bulletin 61-10, Figure 5. This construction would provide a safe roost for eagles.
5. The construction ditches will not be built any further north than necessary and the berm north of the needle point dike will be spread out so they are fairly flat. The dikes throughout the project will be kept to a minimum height as needed for the project. Dikes, buildings, and other structures will be built with materials and colors that blend with the surrounding landscape. The powerline will be constructed with wood poles to blend into the surroundings.
6. If previously unknown cultural or paleontological values are discovered during construction, (i.e., excavation) all work will stop and the District Archaeologist will be called to clear the problem.

7. Upon abandonment of the salt extraction operation, the processing plant and associated facilities located on State land (Section 16, under a lease) will be removed. The earth will be returned to a natural contour and reseeded to specifications of the State of Utah.
8. The dikes and ponds on BLM land will be restored. If the lake level is high, the dikes will be breached so that wave action would reduce the dikes to the flat bottom of the lake. If the lake is dry, the dike material will be spread to the flat contour of the lake bed. All structures will be removed and the surface returned to a natural contour. The process water wells, if still functional, will become the property of BLM. All disturbed areas will be seeded with the seed mix specified in the soils section of the mitigation portion of the EA.
9. The lessee will comply with all State and Federal clear air and water quality regulations and laws.

CRYSTAL PEAK MINERALS CORPORATION

By: Wm V. H. Clarke  
Lessee's Signature  
William V.H. Clarke  
Vice President